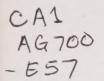
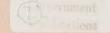


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2011



Report of the
Commissioner of the
Environment and
Sustainable Development

OCTOBER

The Commissioner's Perspective

to the House of Commons

Chapter 1

Climate Change Plans Under the Kyoto Protocol Implementation Act

Chapter 2

Assessing Cumulative Environmental Effects of Oil Sands Projects





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Office of the Auditor General of Canada

The October 2011 Report of the Commissioner of the Environment and Sustainable Development comprises The Commissioner's Perspective and two chapters. The main table of contents for the Report is found at the end of this publication.

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To the Honourable Speaker of the House of Commons:

On behalf of the Auditor General of Canada, I have the honour to transmit herewith this October 2011 Report to the House of Commons, which is to be laid before the House in accordance with section 10.1 of the *Kyoto Protocol Implementation Act*.

Scott Vaughan Commissioner of the Environment and Sustainable Development

OTTAWA, 4 October 2011



To the reader:

I welcome your comments and suggestions on this report and other issues related to the environment and sustainable development. I can be reached at the following address:

Scott Vaughan Commissioner of the Environment and Sustainable Development 240 Sparks Street Ottawa, Ontario K1A 0G6

For general questions or comments, please contact Communications at 613-995-3708 or 1-888-761-5953 (toll free).

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The Commissioner's Perspective

The Commissioner's Perspective



Scott Vaughan
Commissioner of the Environment
and Sustainable Development

Introduction

Canadians have elected a new Parliament that, like every new Parliament, faces new challenges and opportunities. Members of Parliament will deliberate on national priorities; this responsibility requires proper information to guide timely decisions. Inaction or delay today can limit Canadians' choices in the future—including choices that will affect the quality of our environment, and the availability of Canada's natural resources, such as energy—for years to come.

As Commissioner of the Environment and Sustainable Development, my role is to inform Parliament about how well the federal government is managing its environmental and sustainable development commitments. Through objective audit reports, we provide members of Parliament with the information they need to hold the federal government accountable for its action or its inaction.

In this report, I present the results of our audit work on

- the federal government's assessment of cumulative environmental effects of oil sands projects in northern Alberta, and
- its climate change plans under the *Kyoto Protocol Implementation Act*.

I also provide some perspective on recently completed audit work that I believe will be helpful to members of Parliament, as they conduct a statutory review of the *Canadian Environmental Assessment Act*. And finally, I pay tribute to an important and long-term staff member of the Office.

Understanding Ecosystems

Designing environmental protection approaches that mirror nature makes sense. For example, in addition to safeguarding individual rivers and lakes, it is important to track the broader impact of water and air pollution and climate change on ecosystems. It is also important to track long-term effects on human health that can accumulate over time.

The first step in conserving Canada's ecosystems is to understand them. Environmental monitoring is the basis for managing environmental change, reflecting the saying, "If you can't measure it, you can't manage it."

Assessing cumulative environmental effects of oil sands projects

A key tool for understanding and responding to environmental change is environmental assessment. First developed four decades ago, environmental assessments are performed at an early stage of project development to identify the environmental effects that are most likely to occur. This early look at possible environmental effects is based on the simple notion that it is less costly and more prudent to anticipate and avoid pollution or other damages before they occur. Projects that are subject to federal environmental assessments include building or expanding highways and railways, as well as constructing marine ports and gas and oil pipelines.

In addition to understanding the environmental impact of individual projects, it is also important to understand the broader impact of multiple projects in the same region. It is a requirement of the Canadian Environmental Assessment Act that the federal government understand the combined or cumulative effects of numerous projects in the same region. Cumulative environmental assessments can identify and avoid costly domino effects, such as running out of fresh water in a region. These assessments can also help move project planning to a sustainable foundation.

In this audit, we examined what the federal government has done to understand the cumulative effects of oil sands development projects in the lower Athabasca region of northern Alberta. We selected this region because of the high concentration of major projects, operating in or planned for the area, that have significant potential for cumulative effects. These projects have triggered environmental assessments under the Canadian Environmental Assessment Act, which requires the federal government to consider cumulative effects.

For over a decade, Environment Canada and Fisheries and Oceans Canada have warned that key environmental information regarding the effects of oil sands projects has been missing. Since 1999, both federal departments have warned that insufficient environmental information makes it impossible to understand the combined impact of projects in the lower Athabasca region and the impact on ecosystems that are farther away, including the wider Mackenzie Basin of the Northwest Territories. In the absence of this information, it is impossible to track environmental changes over time.

During our audit, we found that, despite repeated warnings of gaps in environmental information, little was done for almost a decade to close many of those key information gaps.

There is no doubt that some environmental trends in the region are well understood. For example, the federal government has reported that oil sands projects are among the largest and fastest-growing sources of greenhouse gas emissions in Canada. The federal government has also reported that air pollutants from oil sands projects have more than doubled in the last decade. For the first time, this pollution has led to acid rain, putting at risk freshwater lakes and boreal forests in northern Alberta and Saskatchewan and, perhaps, in the Northwest Territories.

However, uncertainty persists about other environmental trends, because of insufficient or inadequate environmental monitoring systems. Some of the environmental threats causing these trends include airborne toxic substances and their long-term impact on freshwater quality and wildlife, including the potential downstream impact. As a consequence, decisions about oil sands projects have been based on incomplete, poor, or non-existent environmental information that has, in turn, led to poorly informed decisions.

The Oil Sands Advisory Panel's report and the government's response

Last fall, the former federal Minister of the Environment convened a panel of independent experts, which was chaired by Elizabeth Dowdeswell, to take stock of the monitoring systems in the Athabasca region.

The panel was asked to determine whether a "world-class" environmental monitoring system was in place to track the environmental impact of oil sands development in the lower Athabasca region. The panel's answer was "No." In December 2010, it concluded that the many efforts at environmental monitoring had failed to add up to a coherent, integrated, and credible system.

The federal government responded to the report, as promised and on time, in March 2011. In Phase One of its plan, it acknowledged that fundamental flaws in the current approach existed. These flaws were the result of monitoring systems that were fragmented, inconsistent, poorly calibrated, and lacking in integration and leadership. The government concluded that monitoring activities failed to deliver data of sufficient quantity or quality to detect the effects of oil sands development, and that "strategic decisions for environmental protection (including water

quality) and industry sustainability [could not] be made under such conditions." (from Environment Canada's Lower Athabasca Water Quality Monitoring Plan)

In July 2011, the government released Phase Two of its plan, which set out an integrated environmental monitoring system that, once implemented, will monitor the potential environmental impacts on biodiversity, as well as on air and water in Canada's North.

In my view, the federal government has taken an important step forward by both acknowledging the deficiencies of the current system and setting out a detailed plan to fix them. The federal government's two-stage plan promises to monitor the environmental impact of the oil sands projects, not only in northern Alberta, but also in neighbouring Saskatchewan and the Mackenzie Basin of the Northwest Territories. The plan is based on an ecosystem approach that tracks freshwater, air quality, migratory species, and biodiversity.

A good first step

If fully implemented, these commitments hold the promise of establishing a credible, robust, and publicly accessible monitoring system for measuring environmental conditions and changes in environmental quality levels, as well as determining the sources of those changes. The system will also be used to analyze the changes to water, air, and biodiversity over time. We look forward to reporting to Parliament on the implementation of the government's plan.

We will be looking for a plan that has clear objectives, timelines, roles and responsibilities, and performance outcomes to help Parliament track the government's progress. In particular, we expect the plan and its implementation to be guided by meaningful and enduring partnerships with First Nations communities. I also hope that lessons from the oil sands environmental monitoring commitment will be applied to other regions that the federal government has declared to be "ecological hotspots," from Canada's North to the Bay of Fundy and Great Lake regions.

Upcoming review of the Canadian Environmental Assessment Act

The House of Commons Standing Committee on the Environment and Sustainable Development will shortly begin its statutory review of the Canadian Environmental Assessment Act. This is an important piece of legislation. Its importance was underscored by the government's response to the Oil Sands Advisory Panel, in which it noted the pivotal

role that environmental assessments play in understanding cumulative environmental effects.

In anticipation of the Standing Committee's review of the Canadian Environmental Assessment Act, I have issued a number of audit reports on how well the federal environmental assessment process is working. These include two audit reports tabled in 2009: one that examined the implementation of the Canadian Environmental Assessment Act and a second that examined fish habitat protection under the Fisheries Act. We have reported a number of serious deficiencies in how assessments are planned, carried out, and followed up on.

Done right, environmental assessments warn us of potential problems and specify ways to fix them before they spiral into economic and environmental costs, both today and for our children in the future. Canada was a world leader in designing environmental assessments decades ago. The upcoming review of the *Canadian Environmental Assessment Act* provides an important opportunity to take stock of current practices, improve on-the-ground implementation that can help communities and investors, and streamline steps that only add layers of bureaucracy.

When conducting its review of the Canadian Environmental Assessment Act, the Standing Committee on the Environment and Sustainable Development may wish to

- examine current practices within the context of the founding principles of environmental assessments, including the important principle that assessments are a tool to anticipate and avoid costly human health or environmental effects before they occur;
- identify the kind of projects that warrant significant attention—projects should be selected not only by project scale but also with due regard for fragile ecosystems;
- · clarify the ambiguous wording in the current Act;
- explore how the government can make use of strategic partnerships, including with the provinces, in their environmental assessments to improve its understanding of environmental impact; and
- reaffirm the principle of "one project, one assessment," which means that the combined effects of related projects are examined in a comprehensive manner.

We look forward to supporting the work of the Standing Committee in its review of the Canadian Environmental Assessment Act.

Climate Change Plans under the *Kyoto Protocol Implementation Act*

The Kyoto Protocol Implementation Act requires that the Minister of the Environment prepare an annual climate change plan that sets out the measures the government will take to meet Canada's obligations under the Kyoto Protocol.

The Act also requires that I audit those plans at least once every two years, up to and including 2012. In addition, I am required to prepare a report that includes an analysis of Canada's progress in implementing the climate change plans and meeting the Kyoto Protocol obligations. I am pleased to present my second audit report mandated under the Kyoto Protocol Implementation Act.

At the time of our audit, Environment Canada had published four annual climate change plans (2007–2010). We found that the information in the 2010 plan showed some improvement in completeness and transparency over previous years.

However, we also found that the plans are not in compliance with the *Kyoto Protocol Implementation Act*, because they do not satisfy all of the requirements of section 5(1) of the Act. The measures contained in the plans are not sufficient to achieve the necessary reductions in greenhouse gas emissions that are required to meet Canada's Kyoto Protocol obligations. The 2010 National Inventory Report, which provides information on Canada's levels of greenhouse gas emissions, indicated that Canada's emissions totalled 734 million tonnes in 2008—which is 31 percent more than the Kyoto target of 558.4 million tonnes. Since the first climate change plan in 2007, the government has significantly lowered its target for reducing greenhouse gas emissions. The expected emission reductions have dropped from 282 million tonnes in the government's first plan to 28 million tonnes in 2010, a drop of approximately 90 percent.

In reviewing the plans, we noted that they do not report the total amount of funding that the government has provided for their implementation. Furthermore, financial information for the individual measures is not reported consistently, and some of the measures do not include any financial information. Therefore, we sought to determine the funding allocations associated with each measure in the plans, and found that the federal government had allocated over \$9.2 billion to implement its climate change plans.

I am concerned that, despite the funds that have been allocated to meet Canada's commitments under the Kyoto Protocol, the government has significantly lowered its targets for reducing emissions in its successive plans. A consistent means of linking dollars spent to results achieved across government is essential for parliamentarians to understand exactly what results the substantial spending has achieved toward meeting Canada's international commitment.

Since we finished the audit work for this report (which was to have been tabled in May 2011), the government released its 2011 climate change plan and its 2011 National Inventory Report. We did not include these documents in this audit, but we will examine and report on them in our Spring 2012 Report to Parliament.

The government needs a plan to deliver results

Since the early 1990s, the federal government has made a number of different commitments to tackle climate change. However, the startand-stop pattern of federal program planning has given inconsistent signals to industry, other levels of government, and Canadians about the consistency and predictability of the federal government's approach to reduce greenhouse gas emissions.

Our audit shows that Canada is not on track to meet its commitments under the Kyoto Protocol to reduce greenhouse gas emissions. This is not new. However, the federal government has made new international and national commitments to reduce greenhouse gas emissions, which include commitments set out under the Copenhagen Accord, the 2010 Federal Sustainable Strategy, and the Cancun action plan. All of these establish a commitment to achieving a 17 percent reduction, from the 2005 levels, in greenhouse gases by 2020.

It is unclear whether the federal government will be able to achieve these new reduction targets until a coherent system is in place that has clear objectives, timelines, interim targets, and expectations with key partners. The government will also need an overall strategy to coordinate efficient and effective spending of billions of dollars.

The contribution of Ronald Thompson

No one would have been more eager to support the important work of Canada's new Parliament than Ronald Thompson, who served as interim Commissioner of the Environment and Sustainable Development from 2006 to 2008—as well as holding a variety of other important positions at the Office of the Auditor General for more than 30 years. For me, Ron exemplified the very best tradition of public service to Canadians and Parliament; he was thorough, objective,

rigorous, and principled. He passed away suddenly and tragically this past summer. He served Parliament with distinction and was a beloved colleague. I dedicate this report to his memory.

Chapter

Climate Change Plans Under the Kyoto Protocol Implementation Act

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Climate Change Plans Under the Kyoto Protocol Implementation Act

Main Points

What we examined

In 2007, Parliament passed the Kyoto Protocol Implementation Act "to ensure that Canada takes effective and timely action to meet its obligations under the Kyoto Protocol and help address the problem of global climate change." The Act requires that the Minister of the Environment prepare an annual climate change plan on behalf of the federal government that includes measures designed to ensure that the Kyoto obligations are met.

The Act requires the Commissioner of the Environment and Sustainable Development to analyze the government's progress in implementing the plans and in meeting the Kyoto obligations. It provides that every two years, up to and including 2012, the Commissioner should report on progress in meeting these obligations and on any other matters of importance. We presented our first report to Parliament in May 2009; this is our second mandatory report under the Act.

We examined whether the climate change plans include all the information required by the Act and analyzed progress made in implementing the plans and in meeting Canada's greenhouse gas emissions target under the Kyoto Protocol. We followed up on Environment Canada's progress in meeting commitments made in response to recommendations from our first audit under this mandate, published in 2009.

We also examined whether the climate change plans include the management systems and tools needed to achieve, measure, and report on greenhouse gas emission reductions.

Our audit work included Environment Canada as well as other federal organizations— Agriculture and Agri-Food Canada, the Department of Finance Canada, Natural Resources Canada, and Transport Canada—who are responsible for implementing measures set out in the climate change plans.

Audit work for this report was substantially completed on 2 November 2010.

Why it's important

Canada first agreed to reduce its greenhouse gas emissions when it ratified the United Nations Framework Convention on Climate Change in 1992. When it ratified the Kyoto Protocol in 2002, along with 193 other parties, Canada made commitments to reduce emissions to an average of 6 percent below its 1990 level during the Kyoto commitment period, between 2008 and 2012.

To meet these commitments or subsequent commitments, such as those under the Copenhagen Accord and the Federal Sustainable Development Strategy, it is important to establish a comprehensive plan and an effective governance structure to implement it.

What we found

- The climate change plans developed by Environment Canada in response to the *Kyoto Protocol Implementation Act* are not in compliance with the Act because required information is missing. Environment Canada has made some improvements in the completeness and transparency of the information contained in the climate change plans since 2007. However, the measures contained in the plans are not sufficient to achieve the Kyoto Protocol obligations for reductions in greenhouse gas emissions.
- Canada is not on track to meet its Kyoto Protocol greenhouse gas emissions target. The 2010 National Inventory data indicates that in 2008, Canada's greenhouse gas emissions were 31 percent higher than the Kyoto target. Even if all the measures in the first (2007) annual climate change plan had been implemented as planned and their expected greenhouse gas reductions had been achieved, the reductions would not be sufficient to meet the government's Kyoto Protocol obligations. Expected reductions set out in the climate change plans have dropped by 90 percent since the first plan was published in 2007.
- More than \$9 billion has been allocated to implement the measures outlined in the 2010 climate change plan. However, the government has not established a governance structure that sets out clear roles and responsibilities, quality assurance systems for reporting on greenhouse gas reductions achieved, and financial and performance reporting systems and mechanisms for evaluating the climate change plans.

The departments have responded. The departments agree with our recommendations except for the recommendation on the reporting of financial information (paragraph 1.82). Their detailed responses follow the recommendations throughout the chapter.

Introduction

- 1.1 Canada's government has recognized that climate change is an issue of major concern for Canadians and that climate change is a key challenge facing the world in the 21st century. Recent studies by the Government of Canada indicate that climate change is already having a major impact on Canadian ecosystems and on the health of Canadians. Since 1992, the Government of Canada has made domestic and international commitments to address climate change, including committing to reduce its greenhouse gas (GHG) emissions (Exhibit 1.1). To fulfill these commitments, it has developed plans and programs, monitored and reported on GHG emissions, and allocated billions of dollars.
- 1.2 The Kyoto Protocol was adopted under the United Nations Framework Convention on Climate Change (UNFCCC) in 1997 and contains legally binding commitments for countries to reduce GHG emissions. To date, 193 countries have ratified the Kyoto Protocol, including Canada in 2002. In 2007, the Kyoto Protocol Implementation Act was enacted to ensure that Canada takes effective and timely action to meet its obligations under the Kyoto Protocol. The Act requires that the government publish annual climate change plans that describe the measures to be taken to achieve the necessary emissions target committed to under the Kyoto Protocol—that is, to reduce GHG emissions to an average of 6 percent below its 1990 level during the five-year Kyoto commitment period from 2008 to 2012.
- 1.3 Environment Canada is responsible for preparing the annual climate change plans under the *Kyoto Protocol Implementation Act* and has to date published four plans, one for each year from 2007 to 2010. Departments responsible for implementing the measures in the plans include Agriculture and Agri-Food Canada, the Department of Finance Canada, Environment Canada, Natural Resources Canada, and Transport Canada.

Measures—Government actions, described in the climate change plans, taken to ensure that Canada achieves its greenhouse gas emissions target under the Kyoto Protocol. Measures can be regulatory, market-based, or fiscal and can include federal programs, initiatives, regulations, and incentives.

Exhib 11 The federal government has made domestic and international commitments to address climate change and reduce greenhouse gas emissions

International

Canada commits to reducing greenhouse gas (GHG) emissions by 17 percent below its 2005 level by 2020 under the Copenhagen Accord. Canada's submission to the United Nations Framework Convention on Climate Change notes that this target is to be aligned with the final economy-wide emissions target of the United States in enacted legislation.

At the G8 summit, the G8 leaders establish a long-term objective to reduce global emissions by 50 percent by 2050. A baseline year was not specified.

Domestic

Canada commits to reducing GHG emissions by 17 percent below its 2005 level by 2020 under the new Federal Sustainable Development Strategy.

Environment Canada releases its 2010 climate change plan, as required under the *Kyoto Protocol Implementation Act*, which indicates that Canada's target is to reduce GHG emissions to an average of 6 percent below its 1990 emission level over the 2008–2012 period. The plan also reiterates Canada's target under the Copenhagen Accord.

2007

Environment Canada releases the first climate change plan, as required by the *Kyoto Protocol Implementation Act*, which indicates that Canada's target is to reduce GHG emissions to an average of 6 percent below its 1990 emission level over the 2008–2012 period. The plan reiterates the government's commitment as indicated in "Turning the Corner" and adds a commitment to reduce Canada's total GHG emissions by 60 to 70 percent by 2050. These targets were repeated in the 2008 and 2009 climate change plans.

The Kyoto Protocol Implementation Act is assented to in June 2007.

The "Turning the Corner" plan is announced. The government commits to reducing GHG emissions by 20 percent below Canada's 2006 level by 2020.

The Kyoto Protocol formally enters into force, committing Canada to reducing GHG emissions to an average of 6 percent below its 1990 emission level over the 2008–2012 period.

The federal government releases Project Green—Moving Forward on Climate Change: A Plan for Honouring Our Kyoto Commitment, which commits to reducing GHG emissions by 270 million tonnes per year from 2008 to 2012.

Canada formally ratifies the Kyoto Protocol,

21105

The federal government releases Climate Change—Achieving Our Commitments Together, committing to cut 240 million tonnes of GHG emissions from Canada's projected 2010 level.

2000

The Government of Canada Action Plan 2000 on Climate Change commits to reducing GHG emissions by 65 million tonnes per year from 2008 to 2012.

Canada signs the Kyoto Protocol.

1998

The Kyoto Protocol is adopted under The United Nations Framework Convention on Climate Change.

1997

At the Earth Summit in Rio de Janeiro, Canada ratifies the United Nations Framework Convention on Climate Change.

1992

Mandate of the Commissioner of the Environment and Sustainable Development

Subsection 10.1(1) of the Kyoto Protocol Implementation Act requires the Commissioner of the Environment and Sustainable Development to report on progress made in meeting the requirements of the Act.

At least once every two years after this Act comes into force [22 June 2007], up to and including 2012, the Commissioner of the Environment and Sustainable Development shall prepare a report that includes:

- (a) an analysis of Canada's progress in implementing the Climate Change Plans:
- (b) an analysis of Canada's progress in meeting its obligations under Article 3, paragraph 1, of the Kyoto Protocol; and
- (c) any observations and recommendations on any matter that the Commissioner considers relevant.

Focus of the audit

- This is the second audit required under subsection 10.1(1) of the Act. Part 1 of this report describes our analysis of whether Environment Canada, and other responsible government departments, have developed and implemented climate change plans in accordance with the requirements of the Act. In our audit, we examined whether the 2009 and 2010 climate change plans fulfilled all the requirements set out in subsection 5(1). As part of our mandate under subsection 10.1(1)(a), we also looked at whether the measures in the climate change plans were implemented. Under our mandate provided in subsection 10.1(1)(b) of the Act, we examined whether Canada was on track to attain its GHG emissions target mandated under the Kyoto Protocol.
- The work presented in Part 2 of this report was conducted under 1.6 our mandate in subsections 10.1(1)(a) and (c) of the Act. It provides observations and recommendations that we wish to bring to the attention of Parliament regarding the management systems and practices in place for the climate change plans.
- Our recommendations for Part 1 and Part 2 appear at the end of 1.7 each part. More details about the audit objectives, scope, approach, and criteria are in About the Audit at the end of this chapter.

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Part 1—Compliance with the Kyoto Protocol Implementation Act

Observations

- 1.8 The purpose of the Kyoto Protocol Implementation Act is to "ensure that Canada takes effective and timely action to meet its obligations under the Kyoto Protocol . . .". The Act requires that the Minister of the Environment prepare annual climate change plans that include specific elements, such as
 - a description of the measures to be taken to ensure that Canada meets its obligations under the Protocol,
 - effective dates for the measures,
 - · greenhouse gas emission reductions expected and achieved, and
 - a report describing the implementation of the measures and the plans from the previous year.

Exhibit 1.2 lists the specific requirements of subsection 5(1).

Preparing the climate change plans

- 1.9 In our 2009 audit of the *Kyoto Protocol Implementation Act*, we reviewed the 2007 and 2008 climate change plans to determine if the plans contained all the information required by the Act. At that time, we found that the plans did not meet the requirements of the Act and we recommended that the next annual plans fulfill all the requirements of subsection 5(1) of the *Kyoto Protocol Implementation Act*. Environment Canada accepted this recommendation.
- 1.10 In this current audit, we examined the 2009 and 2010 climate change plans to determine if the plans contained all the information required by the Act. In order to do this, we analyzed the plans and other documentation and conducted interviews with the federal departments with responsibilities for the measures listed in the plans.

The annual climate change plans are not in compliance with the Act

- 1.11 We found that a number of the requirements of the Act, as set out in subsection 5(1), were not met. Although we noted some improvement since our last audit, one or both of the 2009 and 2010 climate change plans have not
 - described measures to be taken that will ensure that Canada meets its Kyoto Protocol obligations,

- provided an effective date for all measures,
- explicitly compared expected emission levels by year with Canada's greenhouse gas (GHG) emission obligation in the Kyoto period,
- included an adequate explanation of how an equitable distribution of GHG emission reductions among economic sectors was calculated, or
- indicated how measures that have not been implemented will be redressed.

Exhibit 1.2 The Kyoto Protocol Implementation Act requires that annual climate change plans contain specific elements

- 5. (1) Within 60 days after this Act comes into force and not later than May 31 of every year thereafter until 2013, the Minister shall prepare a Climate Change Plan that includes
- (a) a description of the measures to be taken to ensure that Canada meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol, including measures respecting
 - (i) regulated emission limits and performance standards,
 - (ii) market-based mechanisms such as emissions trading or offsets,
 - (iii) spending or fiscal measures or incentives,
 - (iii.1) a just transition for workers affected by greenhouse gas emission reductions, and $\,$
 - (iv) cooperative measures or agreements with provinces, territories or other governments;
- (b) for each measure referred to in paragraph (a),
 - (i) the date on which it will come into effect, and
 - (ii) the amount of greenhouse gas emission reductions that have resulted or are expected to result for each year up to and including 2012, compared to the levels in the most recently available emission inventory for Canada;
- (c) the projected greenhouse gas emission level in Canada for each year from 2008 to 2012, taking into account the measures referred to in paragraph (a), and a comparison of those levels with Canada's obligations under Article 3, paragraph 1, of the Kyoto Protocol;
- (d) an equitable distribution of greenhouse gas emission reduction levels among the sectors of the economy that contribute to greenhouse gas emissions;
- (e) a report describing the implementation of the Climate Change Plan for the previous calendar year; and
- (f) a statement indicating whether each measure proposed in the Climate Change Plan for the previous calendar year has been implemented by the date projected in the Plan and, if not, an explanation of the reason why the measure was not implemented and how that failure has been or will be redressed.

Source: Kyoto Protocol Implementation Act

The following paragraphs (1.12–1.19) elaborate on the extent to which the climate change plans complied with the requirements in subsection 5(1) of the Act.

- 1.12 Description of measures. The 2009 and 2010 climate change plans were prepared by Environment Canada with information provided by departments responsible for implementing each measure. Each plan included at least 19 measures with expected annual GHG emission reductions for the Kvoto commitment period (2008 to 2012). A description was provided for each measure; however, subsection 5(1)(a) of the Act requires that the measures described "ensure that Canada meets its obligations" under the Kyoto Protocol. We found that neither the 2009 nor the 2010 plan indicated that these measures were designed to ensure that Canada meets its obligation under Article 3, paragraph 1, of the Kvoto Protocol, which requires Canada to reduce its national GHG emissions to an average of 6 percent below its 1990 level in the commitment period 2008 to 2012. Therefore, as designed, the plans do not describe measures that will ensure that Canada meets its obligation, as required by the Act. We also noted that the plans contained over a dozen measures without expected GHG emission reductions.
- 1.13 Date the measure will come into effect. We found that the plans have improved on this reporting requirement from 2009 to 2010. In the 2010 plan, all measures included a date that the measure would come into effect. By contrast, in the 2009 plan, 10 of 19 measures reported an effective date.
- 1.14 Amount of GHG emission reductions. The 2009 and 2010 plans each identified 19 measures with expected GHG emission reductions (Exhibit 1.3). The plans did not, however, comply with the Act's requirement to compare the expected GHG reductions of each measure with the GHG emission levels in the most recently available National Inventory Report, which provides information regarding GHG emission levels in Canada.
- 1.15 Projected GHG emission levels in Canada. The projected GHG emission level for each year from 2008 to 2012 was provided in both the 2009 and 2010 plans; however, the levels were not explicitly compared by year with Canada's obligation under Article 3, paragraph 1, of the Kyoto Protocol.

National Inventory Report—An annual inventory published by Environment Canada on behalf of the Government of Canada that provides information regarding greenhouse gas emission levels in Canada. The United Nations Framework Convention on Climate Change and the Kyoto Protocol specify reporting requirements for the inventory

Exhibit 1.3 Measures listed in the 2009 and 2010 climate change plans include expected and actual greenhouse gas emission reductions (million tonnes)

Lead responsible department	Measure	Expected emission reductions for 2008–2012 as reported in 2009 Plan	Expected emission reductions for 2009–2012 as reported in 2010 Plan	Actual emission reductions for 2008 as reported in 2010 Plan
Environment	Regulatory Framework for Industrial Greenhouse Gas Emissions	164.4	Not included in the 2010 Plan	Not included in the 2010 Plan
	Regulating Renewable Fuels Content	3.4	4.18	N/A
Canada	Reducing Greenhouse Gas Emissions from New Cars and Light Trucks	No estimates in the 2009 Plan	2.5	N/A
	National Vehicle Scrappage Program	0.085	0.027	0.001
	ecoENERGY for Industry	1.61	5.55	0.64
	ecoENERGY for Personal Vehicles Program	0.35	0.38	0.05
	ecoENERGY for Fleets Program (also included under ecoFREIGHT Program)	2.03	0.62	0.08
Natural Resources	Strengthening Energy Efficiency Standards	6.05	4.91	0.09
Сапада	ecoENERGY for Renewable Heat	0.07	0.074	0.003
	ecoENERGY for Buildings and Houses	5.6	5.54	0.58
	ecoENERGY Retrofit Initiative	5.65	6.27	0.39
	ecoENERGY for Renewable Power	24.73	19.3	1.35
Indian and Northern Affairs Canada	ecoENERGY for Aboriginal and Northern Communities	Not included in the 2009 Plan	0.041	N/A
	Marine Shore Power Program (also included under ecoFREIGHT Program)	0.027	0.015	N/A
	ecoMobility	0.331	0.331	N/A
Transport Canada	ecoTechnology for Vehicles Program	0.523	0.523	N/A
iranspurt vanaua	ecoFREIGHT Program (includes 6 programs — reductions for Marine Shore Power Program and ecoENERGY for Fleets Program are reported separately)	4.711	4.72	N/A
	ecoAUTO Rebate Program	0.05	0.04	0.01-0.03
	Green Levy	0.84	0.74	0.09-0.1
Department of Finance Canada	Promoting Sustainable Urban Transit (Public Transit Tax Credit)	0.174	0.138	0.032
Tillance Gallaua	Clean Air and Climate Change Trust Fund	80.0	No estimates in the 2010 Plan	N/A

Note: There are other measures listed in the plans that do not have quantified emission reductions.

N/A (not applicable) means that these measures did not have actual emission reductions for 2008. Source: A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act, 2009, 2010.

- 1.16 Equitable distribution of GHG emission reductions. The 2009 and 2010 climate change plans indicated that an analysis had been conducted, and it was determined that there would not be any notable inequities among economic sectors that contribute to GHG emissions. However, we found this conclusion difficult to confirm with the information provided in the plans. For example:
 - The criterion for an equitable distribution and the methodology used to determine if there was an equitable distribution of GHG emission reductions among sectors was not specified.
 - The units of measurement were not provided.
 - Inconsistencies in the presentation of data regarding the economic sectors that contribute to GHG emissions made it difficult to compare emission levels with emission reductions by sector. The classification of sectors used to determine an equitable distribution is not consistent with that in the National Inventory Report, nor is it consistent between the 2009 and 2010 plans.

In our view, the information in the 2009 and 2010 plans on the equitable distribution of GHG emission reductions does not satisfy the requirement of subsection 5(1)(d) of the Act.

- 1.17 Implementation of measures for the previous year. The majority of measures included a report describing what had been implemented in the previous year; however, about a quarter of the measures did not provide sufficient detail to be considered as having met this requirement.
- 1.18 Measures implemented by the date projected. Reporting on this requirement has improved since the last audit as the reports for the majority of measures listed in both the 2009 and 2010 plans indicate that the measures were implemented by the date projected (although the date was not provided in many cases). However, almost one quarter of the measures were not yet fully implemented and therefore this information could not be provided for these measures. The 2010 plan stated that only one measure was not implemented by the date projected and explained that this failure was redressed with an interim approach.
- 1.19 Measures to be redressed. The Act requires that an explanation be provided for how the failure to implement a measure by the date projected in the plan would be redressed. Our audit found that the 2010 plan does not describe how the failure to implement the Regulatory Framework for Industrial Greenhouse Gas Emissions, which was to account for over 85 percent of the government's GHG emission

Redress—In the context of the Kvoto Protocol Implementation Act. compensation for the loss of greenhouse gas emission reductions resulting from the failure to implement a measure.

reductions in the 2009 plan, would be redressed (see Exhibit 1.5 for a description of the framework).

- **1.20** We have concluded that the 2009 and 2010 climate change plans are not in compliance with the Act as they do not include all of the information required by subsection 5(1).
- **1.21** Recommendations regarding these observations are found at paragraphs 1.42 and 1.43.

Implementing the plans and achieving results

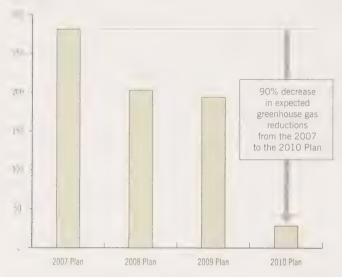
1.22 Subsection 10.1 (1)(a) of the Kyoto Protocol Implementation Act requires that "[...] the Commissioner of the Environment and Sustainable Development shall prepare a report that includes . . . an analysis of Canada's progress in implementing the Climate Change Plans . . .". As part of our audit, we examined whether Environment Canada and other responsible departments had implemented the measures as reported in the 2009 and 2010 plans. To examine implementation, we considered a variety of information, including whether the plan stated that the measure was implemented, if funding for the measure had been allocated, and if the measure had expected or achieved greenhouse gas (GHG) emission reductions. We also followed up on whether Environment Canada had made progress in implementing selected recommendations from our 2009 audit.

The government has lowered its expected greenhouse gas emission reductions by 90 percent since 2007

- 1.23 In examining whether the measures in the plans had been implemented, we reviewed all four climate change plans, from 2007 to 2010, to determine whether the expected GHG emission reductions and the results achieved had remained consistent among the plans. We noted that the amount of expected reductions from the plans decreased from an estimated 282 million tonnes in the 2007 plan to 28 million tonnes in the 2010 plan, a reduction of 90 percent (Exhibit 1.4).
- 1.24 In the 2007, 2008, and 2009 plans, the most significant amount of expected emission reductions from federal measures were to come from
 - the Regulatory Framework for Industrial Greenhouse Gas Emissions, which is no longer included in the 2010 plan; and
 - the Clean Air and Climate Change Trust Fund, whose reductions are attributed to provincial rather than federal measures in the 2010 plan.

Exhibit 1.4 Total expected greenhouse gas emission reductions in the climate change plans have dropped by 90 percent since 2007

Expected greenhouse gas reductions (Million tonnes)



Source: 2007 data calculated by the Office of the Auditor General. Other data is from A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act, published annually since 2007.

Regulatory Framework for Industrial Greenhouse Gas Emissions. This measure, managed by Environment Canada, was to have accounted for about 85 percent (164 million tonnes total in the 2009 plan) of the total amount of expected GHG emission reductions for the 2008 to 2012 Kyoto period (Exhibit 1.5). During our 2009 audit, Environment Canada indicated that the framework would be in place by 1 January 2010. At that time, we noted that there had been delays in implementing the framework and, as a consequence, it was unlikely that the Department would be able to meet its target date for implementation. The framework was eliminated from the 2010 plan.

The 2010 climate change plan and Environment Canada officials noted that the Regulatory Framework for Industrial Greenhouse Gas Emissions was not implemented due to a decision to align Government of Canada actions to address climate change with those of the United States. The 2010 plan reported that the Government of Canada is developing regulations in specific sectors and launching collaborative initiatives with the United States. However, we noted that no equivalent measures with quantified GHG emission reductions have been reported, as required by the Act, to redress the expected reductions that will not occur due to the Regulatory Framework not being implemented.

A recommendation regarding these observations is found at paragraph 1.43.

Exhibit 1.5 The proposed Regulatory Framework for Industrial Greenhouse Gas Emissions would have imposed mandatory targets

In April 2007, the federal government announced plans to develop the Regulatory Framework for Industrial Greenhouse Gas Emissions, which contained two key components:

- mandatory short-term, medium-term, and long-term targets that would have set a limit on the amount of GHG emissions allowed per unit of industrial production that is, GHG emissions intensity (for example, GHG emissions per barrel of oil produced); and
- compliance mechanisms that provided firms with flexibility in how they meet their targets.

The Regulatory Framework was expected to reduce GHG emissions by about 164 million tonnes between 2008 and 2012.

Source: Adapted from A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act, 2009.

- Clean Air and Climate Change Trust Fund. The measure in the 2007, 2008, and 2009 climate change plans that was to account for the second largest amount of reductions (80 million tonnes total from 2008 through 2012) was the \$1.5-billion Clean Air and Climate Change Trust Fund, which provides federal funding to provinces and territories for GHG emission reduction measures. The fund was designed and implemented by the Department of Finance Canada, and the measures are reported in the plans by Environment Canada. Although previous plans contained initial estimates of GHG emission reductions from the trust fund, the 2010 plan noted that because the fund was established on an arm's-length basis, provincial and territorial governments were not required to report to the federal government on how the resources were used and that therefore the impact of the fund on GHG reductions could not be assessed. This matter has been highlighted in previous audits by the Commissioner of the Environment and Sustainable Development and by the Auditor General (December 2008).
- 1.29 Environment Canada has since approached provinces and territories about quantifying reductions associated with the trust fund and has reported this information in the plans. Officials told us that in order to increase transparency and accuracy in reporting on GHG emission reductions in the plans, Environment Canada no longer attributes any GHG reductions from the trust fund to federal measures. Instead, Environment Canada told us that the GHG reductions reported by provinces and territories have been incorporated into the baseline (projected GHG emissions excluding federal government measures). We noted that this amount of GHG reductions is not specifically reported in the plan.

Not all measures are reported to have achieved their expected greenhouse gas emission reductions for 2008

- 1.30 The 2010 climate change plan was the first plan to report GHG emission reductions achieved during the Kyoto period because of a two-year lag required to measure and report actual GHG reduction results. We examined whether the GHG emission reductions achieved in 2008, as reported in the 2010 plan, met the expected reductions presented in earlier plans for each measure and in total.
- 1.31 Since 2007, the climate change plans have contained 19 measures aimed at reducing GHG emissions. Of the measures originally associated with expected reductions for 2008, 12 were reported to have achieved reductions in the 2010 plan. Most of these reported reductions were lower than originally projected: of the 12 measures, 4 achieved the 2008 emission reductions estimated in the 2007 plan. We noted that there has been no redress for the loss of overestimated reductions.

Environment Canada has made progress in implementing previous recommendations

- **1.32** As part of this audit, we followed up on whether Environment Canada has made progress in implementing selected recommendations in our 2009 audit.
- 1.33 Uncertainty ranges. Our 2009 audit recommended that the annual climate change plans describe the quantitative or qualitative uncertainties related to the expected GHG emission reductions for the annual plans as a whole and for the individual measures where possible. Specifying the uncertainty range is important so that data limitations and the extent to which results are accurate are clear.
- 1.34 Regarding individual measures, we found that the 2009 climate change plan listed an uncertainty range for expected GHG emission reductions for 16 of 19 measures and that the 2010 climate change plan listed an uncertainty range for 14 of 19 measures. The plans did not explain the absence of uncertainty ranges for some measures. An annex to the 2010 climate change plan provides the methodology used to estimate uncertainties for the projections. We did not examine the accuracy of each estimate because this type of annual analysis is conducted by the National Round Table on the Environment and the Economy. We nevertheless can conclude that Environment Canada and other responsible departments made progress by providing an uncertainty range for most of the individual measures. We also noted that for the plans as a whole, the uncertainty analysis carried out does not provide a range of GHG reduction estimates.

1.35 Methodology for measuring reductions. In our 2009 audit, we recommended that Environment Canada indicate how it would measure actual GHG emission reductions for each of the measures in the plan. We found that 12 of the 19 measures listed in the 2010 plan were reported to have achieved reductions for 2008. All 12 measures included a discussion of the methodology used for measuring GHG reductions, although the detail of the methodology provided varied significantly. Some measures provided limited information regarding the methodology used to estimate reductions, stating that GHG reductions were based on program participation. Nevertheless, Environment Canada has made progress implementing our recommendation to include an explanation of the methodology used to report actual reductions.

Meeting Kyoto Protocol obligations

- 1.36 Our mandate in the Kyoto Protocol Implementation Act under subsection 10.1(1)(b) requires that we report on Canada's progress in meeting its greenhouse gas (GHG) emissions target under the Kyoto Protocol. Ultimately, it is the United Nations Framework Convention on Climate Change Secretariat that will determine, in 2014, if Canada and other countries have met their obligations. However, the Kyoto Protocol states that "each Party [...] shall, by 2005, have made demonstrable progress in achieving its commitments under this Protocol" and subsection 5(1)(a) of the Act requires the Minister of the Environment to develop climate change plans to meet these obligations. Therefore, we assessed whether Canada was on track to meet its Kyoto Protocol GHG emissions target based on the 2010 plan.
- 1.37 Article 3, paragraph 1, of the Kyoto Protocol requires that, between 2008 and 2012, Canada's average GHG emission level should be at least 6 percent below its 1990 emission level, or 558.4 million tonnes. More specifically, this means that for this five-year period, the total GHG emissions in Canada should not exceed 2,792 million tonnes.

Canada is not on track to meet its greenhouse gas emissions target under the Kyoto Protocol

1.38 The 2010 annual National Inventory Report of GHG emissions was published on 15 April. It noted that, in 2008 (the first year of the commitment period to contribute to the calculation of the average GHG emissions level against the target), the emissions level for Canada was 734 million tonnes or 31 percent above the required target (Exhibit 1.6).

Greenhouse gas emissions
(Million tonnes)

Emissions expected by the Government of Canada in the 2010 climate change plan

Actual emissions in 2008 were 734 million tonnes or 31 percent above the Kyoto target

The Kyoto target for 2008–2012 is 558.4 million tonnes

The Kyoto target for 2008–2012 is 558.4 million tonnes

Exhibit 1.6 A gap exists between the Kyoto Protocol target and the Government of Canada's expected greenhouse gas emissions in the 2010 climate change plan

Note: Information for 2009 was not available at the time of our audit.

Source: Adapted from Environment Canada's National Inventory Report, 1990–2008: Greenhouse Gas Sources and Sinks in Canada (May 2010) and A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act (May 2010)

1.39 Our audit found that even if all the measures in the first annual climate change plan had been implemented as planned, and achieved their expected GHG emission reductions, they would not be sufficient to meet the government's Kyoto Protocol target. Since the first plan, expected GHG reductions have been lowered by 90 percent in subsequent climate change plans. In the absence of additional information, in our view, Canada is not on track to meet its GHG emissions target under the Kyoto Protocol and the Kyoto Protocol Implementation Act.

Recommendations

1.40 The federal government's 2009 and 2010 climate change plans do not contain all the information required under the *Kyoto Protocol Implementation Act*. The plans have not established sufficient measures to achieve the government's commitments under the Kyoto Protocol, and do not include all of the information that Parliament has requested in order to carry out its oversight of the government's efforts to meet its international obligations.

1.41 Since 2007, the federal measure expected to result in the most significant amount of GHG emission reductions was the Regulatory Framework for Industrial Greenhouse Gas Emissions. The framework

is not included in the 2010 climate change plan, and no equivalent measures have been reported to redress the reductions that will not occur in the absence of the framework.

1.42 Recommendation. Environment Canada should ensure that future climate change plans for the purposes of the *Kyoto Protocol Implementation Act* contain all the information required by the Act or clearly state why the plans do not do so.

The Department's response. Agreed. Environment Canada has made significant annual improvements to the plans and produces a comprehensive and detailed document that reflects the government's commitment to comply with the *Kyoto Protocol Implementation Act*'s information requirements to the furthest extent possible. The Commissioner of the Environment and Sustainable Development has identified specific areas where there is room for further improvement, such as strengthening details on implementation of measures. The Department, with the contribution of responsible departments, will seek to address these issues, beginning with the plan for 2011.

This recommendation has implications for a number of federal departments, and they have been consulted on this response.

1.43 Recommendation. Environment Canada and departments responsible for implementing measures in the climate change plans should include an explanation in the plans of how measures not implemented will be redressed in terms of greenhouse gas emission reductions.

The departments' response. Agreed. Environment Canada and responsible departments will continue to provide up-to-date information on federal climate change activities. When measures for the previous calendar year have been delayed or not implemented, departments will provide a clear explanation for the change in implementation status.

The Government of Canada has been clear that it is moving forward on meeting its commitment to reduce GHG emissions by 17 percent by 2020 compared with 2005 levels. It has replaced its earlier regulatory approach, entitled Turning the Corner, with a new sector-based approach that, where appropriate, aligns with actions taken in the U.S. Significant progress has been made in the electricity and transportation sectors (emission standards for new passenger automobiles and light trucks), and the actions taken so far by the federal and provincial governments are expected to achieve one

quarter of the emission reductions needed by 2020 to meet our commitment of reducing Canada's annual GHG emissions to the target level of 607 million tonnes.

Canada is participating in a global approach under the Cancun Agreements, which were signed by developed and developing countries accounting for over 85 percent of global GHG emissions.

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Part 2—Managing Climate Change Plans

Observations

- 1.44 Climate change is a complex issue. Developing and implementing plans that address Canada's national and international climate change commitments is inherently challenging. The government has acknowledged that a complex issue that implicates a number of federal organizations, such as climate change, requires effective management of horizontal initiatives, including the need for appropriate governance and accountability mechanisms.
- 1.45 Our past audits dealing with the management of climate change in 1998, 2000, 2001, and 2006, and our past audit of horizontal initiatives in 2005, identified key management gaps. These audits found, among other things, that the government had not created an effective governance structure for managing climate change activities and that insufficient attention paid to horizontal initiatives had caused weaknesses in horizontal governance, accountability, and coordination.
- 1.46 Since these audit reports were issued, the Kyoto Protocol Implementation Act was put in place and the government has developed four climate change plans. This part of our report presents observations and recommendations that we wish to bring to the attention of Parliament, commensurate with our mandate under subsections 10.1(1)(a) and (c) of the Kyoto Protocol Implementation Act. During our audit work designed to examine progress in implementing the climate change plans, we looked at the extent to which
 - the government has put in place the management systems and tools needed to achieve, measure, and report on greenhouse gas (GHG) emission reductions;
 - the government has reported on funding allocated to measures in the annual climate change plans; and
 - quality assurance and verification systems were in place to report on GHG emissions and reductions in the plans.

Although these items are not requirements of the Kyoto Protocol Implementation Act, they are key elements important to support sound program management. If the federal government is to reduce GHG emissions and meet its national and international commitments, it will need appropriate governance and accountability mechanisms to do so.

Horizontal initiative—According to the Treasury Board of Canada Secretariat, an initiative in which partners from two or more organizations have established a formal funding agreement to work toward the achievement of shared outcomes. The objective of reporting on horizontal initiatives is to provide parliamentarians, the public, and government with an overall picture of public expenditures, plans, and performance regarding these shared

Establishing management systems

1.47 The November 2005 Report of the Auditor General of Canada. Chapter 4, Managing Horizontal Initiatives, found that the government had not developed enough specialized tools for the governance, accountability, and coordination of federal efforts to manage horizontal initiatives. In the 2006 Commissioner of the Environment and Sustainable Development chapter, Managing the Federal Approach to Climate Change, we recommended that the government ensure the development and implementation of effective governance and accountability for the climate change issue. In response, the government agreed that climate change was a complex issue requiring effective horizontal management and in 2007 developed a horizontal management accountability and reporting framework for its Clean Air Agenda (Exhibit 1.7). Although we did not examine the Clean Air Agenda in this audit, and cannot attest to its effectiveness, it is an example of how an accountability and reporting framework has been developed to address matters related to climate change. Just over half of the measures listed in the climate change plans are also part of the Clean Air Agenda. The rest of the measures in the plans are not part of a horizontal management accountability and reporting framework.

1.48 According to Treasury Board of Canada Secretariat guidance documents, a results-based management accountability framework for a horizontal initiative includes, among other things, a governance structure that specifies roles and responsibilities and common goals and objectives; performance measurement and financial reporting information that links resources to results; and an evaluation strategy.

Exhibit $1.7\,$ A horizontal management accountability and reporting framework was developed for the Clean Air Agenda

In 2007, the federal government established the Clean Air Agenda as its response to achieving tangible improvements in Canada's environment, including reduced air pollution and greenhouse gas emissions. The Clean Air Agenda included over 40 programs and initiatives and initial budget allocations of \$1.9 billion between 2007 and 2011.

In approving the Clean Air Agenda, ministers from nine federal departments and agencies put in place a management framework to ensure effective horizontal governance and accountability. The framework is led by Environment Canada.

Source: Horizontal Initiative: The Clean Air Agenda, 2007

The government has not put in place management systems and tools needed to achieve, measure, and report on greenhouse gas emission reductions

- 1.49 We found that there is no overall horizontal management accountability initiative in place for the climate change plans. Officials told us that after the Act was passed in June 2007, the first climate change plan was assembled by August 2007 with no additional funding, resources, or new policy direction. We found that most of the measures contained in the plans were already in place at the time the Act came into effect and the first plan was prepared. These measures had individual reporting and accountability mechanisms as well as a variety of objectives, funding sources, and implementation dates. However, there was no overall management system for the plans that integrated these individual reporting and accountability requirements to achieve, measure, and report on the plan as a whole. We found the following management systems and tools were missing or unclear in the 2009 and 2010 climate change plans.
- 1.50 Roles and responsibilities. Documented roles and responsibilities are an important part of a successful management system. In order to prepare the annual climate change plans, Environment Canada collects information each year from the departments responsible for implementing the measures using a template that is signed off by the responsible deputy minister. However, we found that the roles and responsibilities for implementing, measuring, and reporting on the GHG reductions expected and achieved were not always clear.
- 1.51 For example, while the Department of Finance Canada is responsible for implementing the Public Transit Tax Credit, Environment Canada is responsible for ensuring the quality of the results reported, even though it is the Deputy Minister of Finance that signs off on the template providing the information for the climate change plan. In another example, roles and responsibilities for the Clean Air and Climate Change Trust Fund were not documented and were still being discussed during our audit. Two entities responsible for the implementation of measures in the plans told us that it is unclear why their measures are included in the plans at all since they were in place before the first plan was published. Documented roles and responsibilities would clarify the ways in which partners are accountable to each other and to Parliament for the implementation, measurement, and reporting on measures in the climate change plans.

- 1.52 Goals and objectives. Treasury Board guidance indicates that a horizontal initiative needs to be built on a foundation of common values and goals that should be explicit. We found inconsistencies between the purpose of the plans and the goals and objectives of the measures in the plans. For example, although the purpose of the Act is to ensure that the Kyoto Protocol GHG emissions target is met, we found that none of the measures in the plans specified this as a goal or objective. Furthermore, although the Act requires reporting the annual amount of expected and actual GHG emissions and reductions in the plans, some department officials told us that it is not always possible to report results in this manner as they will not be quantifiable until the end of the program.
- 1.53 Also, we found that several of the measures identified in the plans have no expected emission reductions associated with them, or will not result in emission reductions until after 2012, the end of the Kyoto Protocol commitment period. There were 14 of these initiatives in the 2009 plan and 15 in the 2010 plan. Examples include Natural Resources Canada's \$1.48 billion ecoENERGY for Biofuels Initiative, Agriculture and Agri-Food Canada's \$159.4 million ecoAGRICULTURE Biofuels Capital Initiative, and the \$500-million Sustainable Development Technology Canada NextGen Biofuels Fund (Exhibit 1.8). Clarification of the objectives for the plans and the criteria for including specific measures in the plans would help ensure that all the measures are working toward a foundation of common goals and objectives.
- 1.54 Evaluation. An important element of public accountability is the requirement for departments that are allocated resources to periodically evaluate the effectiveness of plans and policies to ensure that they are achieving their objectives as intended. While many of the measures in the plans had evaluations planned, under way, or completed, other measures had not been evaluated. Examples of measures not formally evaluated include the Green Levy on fuel-inefficient vehicles and the Clean Air and Climate Change Trust Fund. Furthermore, Environment Canada does not have plans in place to conduct an evaluation of the climate change plan as a whole. Therefore, the extent to which measures are working together to address the overall objectives of the plan is unknown, and the relationship between resources and results is unclear.

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- 1.55 Performance measurement. An ongoing performance measurement strategy that outlines how information will be collected and how progress will be measured against planned results is a key feature of an effective management system. We looked at two aspects of performance measurement, including the reporting of financial information and quality assurance on GHG emission reduction results achieved. In both cases, we found a lack of consistent information that would allow Parliament to link resources to results. We discuss these aspects in more detail in the following sections.
- **1.56** A recommendation regarding these observations is found at paragraph 1.81.

Reporting financial information

1.57 Although reporting of financial information is not a requirement for the climate change plans under the *Kyoto Protocol Implementation*Act, it is a sound principle of good management to include this information in the plans so that departments, Parliament, and Canadians can understand the links between resources and results achieved by the measures. We examined funding allocated to the measures in the annual climate change plans. We interviewed departmental staff and reviewed departmental performance reports, Treasury Board submission documents, evaluation reports, and internal correspondence to determine the funds allocated for these measures.

Financial information is not reported consistently for the measures in the 2010 plan

- **1.58** We found that there was no financial reporting for the climate change plan as a whole that provided information on funding allocated and spent to reduce greenhouse gas (GHG) emissions. We found that 6 of the 19 measures with expected GHG reductions in the 2010 climate change plan did not report any financial information in the plan.
- 1.59 Because financial information was not consistently available in the 2010 plan, we sought to determine how much had been allocated to the measures. We found that, as of November 2010, more than \$9 billion had been allocated among seven departments to the measures listed in the plans. We also found that several of these measures, allocated approximately \$5.9 billion, are not expected to achieve any GHG emission reductions during the Kyoto Protocol commitment period (Exhibit 1.8).

Exhibit 1.8 Measures listed in the 2010 climate change plans amount to more than \$9 billion in allocated funding

Lead responsible department	Measure	Total funding allocated for each measure for all program years (in millions)	
Environment Canada	Regulating Renewable Fuels Content	\$7.7	
	Reducing Greenhouse Gas Emissions from New Cars and Light Trucks	\$15.7	
	National Vehicle Scrappage Program	\$92.0	
	ecoENERGY for Industry	\$18.0	
	ecoENERGY for Personal Vehicles Program	\$21.0	
	ecoENERGY for Fleets Program (also included under ecoFREIGHT Program)	\$22.0	
Natural Resources	Strengthening Energy Efficiency Standards	\$32.0	
Canada	ecoENERGY for Renewable Heat	\$36.0	
	ecoENERGY for Buildings and Houses	\$61.0	
	ecoENERGY Retrofit Initiative	\$805.0	
	ecoENERGY for Renewable Power	\$1,480.0	
Indian and Northern Affairs Canada	ecoENERGY for Aboriginal and Northern Communities	\$15.0	
	Marine Shore Power Program (also included under ecoFREIGHT Program)	\$6.0	
	ecoMobility	\$10.0	
Transport Canada	ecoTechnology for Vehicles Program	\$15.0	
	ecoFREIGHT Program (includes 6 programs—reductions for Marine Shore Power Program and ecoENERGY for Fleets Program are reported separately)	\$33.0	
	ecoAUTO Rebate Program	\$264.0	
Department of Finance Canada	Green Levy	N/A ¹	
	Promoting Sustainable Urban Transit (Public Transit Tax Credit)	\$389.0	
Various	Clean Air and Climate Change Trust Fund	\$1,519.0	
departments (measures in plans without quantified GHG emission reductions expected)	ecoENERGY for Biofuels Initiative	\$1,480.0	
	ecoAGRICULTURE Biofuels Capital Initiative	\$159.4	
	Sustainable Development Technology Canada in next generation renewable fuels	\$500.0	
	Total for all other measures listed in plans with no quantified GHG emission reductions expected	\$2,305.4	
TOTAL		\$9,286.2	

^{1.} Not applicable as the levy results in an increase in revenue.

Source: Funding information compiled by OAG with information supplied by departments.

- **1.60** For the measures that did report financial information in the 2010 plan, we found the following:
 - The funding levels indicated in the plans were not consistent with the funding information provided to us directly by department officials or indicated in other departmental reports for about half of these measures. This was most often due to differing administrative and reporting procedures across measures and among departments.
 - The period of time over which the funds were allocated was not clear and was not consistently reported in the plans. Although the Kyoto commitment period is 5 years, from 2008 to 2012, we found that the funding allocations for the measures listed in the plans ranged from periods of 4 to 14 years, with one measure extending until 2021. While the plans are for the purposes of the Kyoto Protocol, it is not possible to determine from the plans how much funding was allocated to achieve GHG emission reductions during the Kyoto period.
 - Funding for many of the measures is planned to end in 2011, although the Kyoto commitment period is 2008 to 2012.
- 1.61 Overall, we found that reporting of financial information in the plans is not consistent among measures. Furthermore, the extent to which funding has been allocated to measures that are expected to result in GHG emission reductions during the Kyoto Protocol commitment period is not clear and transparent to Canadians.
- 1.62 Each year, Environment Canada provides a template to departments responsible for implementing the measures that requests information for inclusion in the climate change plans. However, this does not include financial information. Requesting annual updates on funding allocated and spent on these measures and including this information with the GHG reduction results would ensure that Parliament and Canadians can link resources to results achieved.
- **1.63** A recommendation regarding these observations is found at paragraph 1.82.

Establishing quality assurance and quality control systems

- 1.64 As part of our audit work related to ongoing performance measurement, we examined whether there were systems in place to monitor and report greenhouse gas (GHG) emissions and reductions data presented in the 2010 plan. Quality assurance and quality control (QA/QC) systems are important to ensure that credible information is reported to Parliament and Canadians as well as to the United Nations Framework Convention on Climate Change (UNFCCC). A number of international organizations have developed standards for quantifying, monitoring, reporting, and verifying GHG emissions and reductions (Exhibit 1.9).
- 1.65 According to these standards, a QA/QC system consists of routine technical activities to assess and maintain the quality and completeness of the overall process, from initial data collection to the development of estimation methods to final publication of the GHG information. The system also includes a planned system of verification activities, preferably by independent experts. As part of these standards, the required activities are designed to improve the transparency, consistency, completeness, accuracy, and conservativeness of GHG reductions in the preparation and publication of GHG information.

Exhibit 1.9 There are established standards and guidelines for quantifying, monitoring, reporting, and verifying greenhouse gas (GHG) emissions and reductions

ISO 14064, ISO 14065, and ISO 14066

The International Organization for Standardization (ISO) has developed standards for GHG accounting and verification (ISO 14064–2006), for the accreditation of the bodies that carry out these activities (ISO 14065–2007), and for the certification of professionals providing GHG validation and verification services (ISO 14066–2011).

2006 IPCC Guidelines for National Greenhouse Gas Inventories

The Intergovernmental Panel on Climate Change (IPCC) has developed guidelines to assist countries in producing inventories that are neither over- nor under-estimated so far as can be judged, and in which quantitative and qualitative uncertainties related to GHG emissions are reduced as far as practicable.

Greenhouse Gas Protocol Initiative

This protocol, first published in 2001 by the World Resources Institute and the World Business Council for Sustainable Development, is a widely used international accounting and reporting standard for government and business leaders in quantifying and managing GHG emissions.

Greenhouse Gas Accreditation Program

This program was developed in 2009 by the Standards Council of Canada, which is currently the only Canadian organization offering internationally recognized accreditation for GHG validation and verification bodies. Accreditation is based on the ISO standards (see above) for GHG validation and verification bodies (ISO 14065).

Quality assurance systems have been implemented for reporting Canada's greenhouse gas emissions

- **1.66** In accordance with the reporting requirements of the UNFCCC and the Kyoto Protocol, Environment Canada publishes, on behalf of the Government of Canada, an annual GHG emissions inventory, the National Inventory Report, which estimates sectoral and overall GHG emissions for Canada. We examined whether Environment Canada had established and implemented a QA/QC system that conforms with the UNFCCC and Kyoto Protocol reporting requirements.
- 1.67 We found that Environment Canada has developed and implemented a QA/QC system that is integrated in the inventory development process. Canada's 2010 QA/QC system generally conformed to the requirements of the UNFCCC. Environment Canada's plan and schedule for the QA/QC system have, for the most part, been implemented as planned. The inventory includes a comprehensive description of the methods used in compiling the inventory, the data sources, the institutional structures, and QA/QC activities.
- 1.68 Furthermore, the UNFCCC has independent expert review teams that examine annual GHG inventories to assess the extent to which they are transparent, accurate, and complete, and that they conform to the reporting guidelines. The review of Canada's 2009 National Inventory Report indicated that Canada has improved the implementation of its QA/QC plan and the methodologies for estimating GHG emissions from the energy sector. This review also indicated that the 2009 Report generally contains the required information, including information on the QA/QC system, and that it is generally in line with the reporting guidelines. However, we noted that the review made a number of recommendations, mainly to continue to improve the transparency and/or completeness of the reporting on the energy, waste, and chemical industry sector, as well as the land use, land use change, and forestry sector.

Adequate quality assurance systems have not been established for reporting actual greenhouse gas emission reductions for 2008

1.69 The 2010 climate change plan is the first to report actual GHG reduction results for 2008. We examined whether adequate QA/QC systems were in place for selected measures that reported actual GHG emission reductions for 2008 in the 2010 plan. We also examined whether these systems were in place for reporting on the total 2 million tonnes of actual GHG reductions reported for 2008 in the 2010 plan.

1.70 Of the 12 measures that reported actual GHG reductions for 2008 in the 2010 climate change plan, we selected the 7 measures with the most reductions, which accounted for over 95 percent of the actual reductions as reported by responsible departments (Exhibit 1.3). Of these 7 measures, 6 were implemented by Natural Resources Canada, and 1 was under the shared responsibility of the Department of Finance Canada and Transport Canada. Environment Canada was responsible for combining the actual reductions reported by departments and reporting the total actual reductions for 2008.

1.71 We examined whether there was an adequate QA/QC system in place for quantifying, monitoring, and reporting each selected measure's actual GHG reductions achieved in 2008 as well as for the total actual GHG reductions achieved in 2008 by the plan. We reviewed the 2010 plan to determine whether it reported on QA/QC systems consistent with the key principles of established standards (Exhibit 1.9) that are designed to improve the transparency, completeness, and accuracy, or conservativeness of the reported actual reductions as well as to ensure the additionality of these reductions.

1.72 We found that the 2010 plan did not include a discussion on QA/QC systems for the selected measures or for the plan as a whole. Therefore, we conducted audit work to determine whether the activities carried out to quantify, monitor, and report the actual GHG emission reductions for 2008 were consistent with key principles of established standards, such as ISO 14064-2. Specifically, we looked at whether

- the actual reductions reported for the selected measures and for the plan as a whole had been validated or verified by the responsible department or by an independent third party, including data quality management;
- the selected measures or the plan and the corresponding baselines
 against which the actual GHG reductions were estimated were
 described in the documentation provided by responsible
 departments, along with the calculation methods used in each
 case; and
- the documentation provided by responsible departments included a demonstration of the reported actual reductions' additionality.

1.73 We found that the actual GHG émission reductions reported for 2008 in the 2010 plan were not validated or verified against the established standards' key principles, which are usually satisfied by carrying out a number of activities. One of the recommended QA/QC

Additionality -A requirement that the greenhouse gas emission reductions from a measure be additional to what would have happened in the absence of the measure

Baseline -- A hypothetical reference case describing the conditions most likely to occur in the absence of a proposed measure to reduce greenhouse gas emissions

activities for data quality management consists of identifying and reducing the uncertainties related to GHG reductions as far as practicable. We found that among the seven measures examined, the Green Levy is the only one providing an uncertainty range for the actual reductions for 2008 in the 2010 plan. However, we noted that QA/QC activities are undertaken for all measures and for the plan as a whole to manage the quality of monitored data used in the calculation of the actual GHG reductions. For example, we found procedures for validating or verifying data relating to program participation, vehicles sales, and energy production.

- 1.74 In the 2010 plan as well as in documents provided by the departments, we found that there were no transparent and complete descriptions of the measures together with their corresponding baselines and that their related GHG emissions were not identified. We also noted that the calculation methods, including justifications of assumptions and parameters as well as references, are not documented such that another party can reproduce the reported actual GHG reductions. Furthermore, demonstrations of the additionality of the actual reductions reported for 2008 relative to their corresponding baselines were not provided.
- 1.75 Therefore, we found that although elements of a QA/QC system were implemented for managing data quality, other key elements were missing, mainly related to the transparency, completeness, accuracy, or conservativeness of the baselines. As such, the additionality of the reported actual reductions cannot be determined. Overall, we found no consistent QA/QC system across measures and the plan as a whole that conformed to key principles of established standards for reporting actual GHG emission reductions.
- 1.76 Finally, we found that the departments responsible for implementing the measures and reporting the actual reductions for 2008 were not required by Environment Canada to provide information about QA/QC activities used for preparing and reporting their actual GHG reductions. We also noted that uncertainty analyses for the actual total reductions reported for 2008 (two million tonnes) were not provided, as is the case for the expected GHG reductions by measure.
- 1.77 A recommendation regarding these observations is found at paragraph 1.83.

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Recommendations

- 1.78 We found that the climate change plans lack key management systems and tools needed to achieve, measure, and report on greenhouse gas (GHG) emission reductions. Key elements missing include clear roles and responsibilities, goals and objectives, evaluation and performance measurement strategies to ensure effective financial reporting, and quality assurance on results reported. Therefore, Parliament and Canadians may not have all the information needed to hold the government to account for meeting its commitments on climate change.
- 1.79 Despite allocating more than \$9 billion to the measures to reduce GHG emissions in its climate change plan, the federal government has no financial reporting structure in place for the plan as a whole, and financial information for the measures in the plans is not reported clearly or consistently.
- 1.80 There is no comprehensive QA/QC system that is consistent across measures and the plan as a whole and based on established standards for the reporting of actual GHG reductions for 2008 in the 2010 plan. Thus, it is not possible to know the extent to which the reported actual GHG reductions are credible.
- **1.81** Recommendation. Environment Canada should ensure that future climate change plans are supported by an appropriate management accountability and reporting framework that includes
 - clear roles and responsibilities,
 - clear goals and objectives for the plans and for the measures,
 - an evaluation strategy, and
 - ongoing performance measurement that includes transparent financial reporting and quality assurance on greenhouse gas emissions and reductions reported.

The Department's response. Agreed. Environment Canada accepts this recommendation although it is not a requirement under the *Kyoto Protocol Implementation Act*.

The new Federal Sustainable Development Strategy (FSDS) provides a management and reporting instrument that will outline much of the information recommended by the Commissioner of the Environment and Sustainable Development. The FSDS is a permanent and transparent mechanism that aligns well with the long-term nature of challenges associated with climate change. It will provide an integrated,

whole-of-government picture of actions and results on climate change and other environmental priorities. In linking to the government's expenditure planning and reporting system, it also makes transparent the resources associated with climate change initiatives. Finally, the FSDS uses the Canadian Environmental Sustainability Indicators to measure, monitor, and report on progress.

The FSDS will augment core management accountability and reporting instruments operating outside of the Act. These include annual reports on plans and priorities, departmental performance reports, and the evaluation plans of departments consistent with Treasury Board's Policy on Evaluation.

Where appropriate, references to these instruments will be made in the 2011 and future Plans for the Purposes of the *Kyoto Protocol Implementation Act*. These references will direct interested parties to these additional sources of information.

Departments responsible for implementing measures in the plans have been consulted on this response.

1.82 Recommendation. Environment Canada should ensure that requirements for the reporting of financial information by departments responsible for implementing and reporting on measures in the climate change plans are clear and consistent. These departments should ensure that this financial information is provided in a timely manner. Environment Canada should ensure that financial information, including all funds allocated and spent, is reported for all measures in the annual climate change plans.

The Department's response. Disagreed. Environment Canada does not accept this recommendation.

The Kyoto Protocol Implementation Act is focused on the reporting of emission reductions associated with Government of Canada climate change initiatives and does not include any requirement for financial reporting in the annual plans. Such information is provided to Parliament through the existing Expenditure Management System, including departmental performance reports and reports on plans and priorities. Further, these instruments of financial reporting will be supplemented by additional reporting to Parliament under the new Federal Sustainable Development Strategy, which is designed to link with the Expenditure Management System and will include extensive reporting on efforts to reduce GHG emissions.

If there is a need to improve financial reporting on environmental activities, such as reducing GHG emissions, it would be more effective to do so through instruments designed for financial reporting, as opposed to the annual plans under the *Kyoto Protocol Implementation Act*.

Departments responsible for implementing measures in the plans have been consulted on this response.

- 1.83 Recommendation. Departments responsible for implementing and reporting on measures in the climate change plans—including Natural Resources Canada, Transport Canada, the Department of Finance Canada, and Environment Canada—should develop and implement a quality assurance and quality control system for reporting actual greenhouse gas emission reductions, measured or estimated against a baseline. This should include
 - publishing complete and transparent information regarding the analysis underlying each measure and its corresponding baseline, the calculation methods for the reductions, and how the criterion of additionality has been defined and met; and
 - documenting the accuracy of the actual greenhouse gas emission reductions by providing an uncertainty range for each measure and for the total of all measures, for each remaining year of the Kyoto Period (2009 to 2012). This information should be published in the next climate change plans.

The departments' response. Agreed. Beginning with the 2011 plan, Environment Canada will work with other departments, wherever possible, to provide greater clarity on the consistency of quality assurance and verification systems by asking that departments preparing greenhouse gas (GHG) estimates clearly describe

- the analysis, including methodology and assumptions, underlying the measures;
- the process that departments used to develop the baseline(s);
- the calculation methods for GHG reductions; and
- how the criterion of additionality has been defined and met.

In addition, departments preparing GHG estimates will be asked to provide a range for the actual GHG reductions associated with each measure. Environment Canada will also investigate ways through which to build upon the sensitivity analyses currently underpinning the reference case and alternative scenario for the total of all measures.

Conclusion

Government commitments

- 1.84 The Government of Canada has committed to addressing climate change by reducing its national greenhouse gas (GHG) emissions in various plans and agreements since 1992 (Exhibit 1.1). Since this time, however, national GHG emissions have risen and were 24 percent higher in 2008 than in 1990 and 31 percent higher than Canada's Kyoto target.
- 1.85 In 2010, the federal government committed to a new GHG emission reduction target under the Copenhagen Accord, an outcome of the 2009 Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), which aims to reduce GHG emissions after the Kyoto commitment period (2008–2012). In its January 2010 submission to the UNFCCC, Canada committed to a GHG emission reduction target of 17 percent, relative to its 2005 emissions level, by 2020. The submission also noted that this target was "to be aligned with the final economy-wide emissions target of the United States in enacted legislation." The 2010 Federal Sustainable Development Strategy also committed to this GHG emission reduction target. In January 2011, Environment Canada reported that all existing government actions taken together would generate about one quarter of the reductions needed to achieve the 2020 Copenhagen target.

Concluding observations

- 1.86 Environment Canada, on behalf of the Minister of the Environment, is responsible for the preparation of the annual climate change plans for the purposes of the *Kyoto Protocol Implementation Act*. Overall, we conclude that the climate change plans are not in compliance with the Act as they are missing information required by subsection 5(1). Furthermore, the measures in the plans are not sufficient to meet the Kyoto Protocol obligations for reducing greenhouse gas emissions.
- 1.87 Environment Canada has made improvements in some reporting requirements in response to recommendations from our 2009 audit, including providing an uncertainty range for the expected reductions for the measures in the plans. These improvements have contributed to a more complete and transparent plan in 2010 as compared with the first plan in 2007. In substance, however, the 2010 plan does not contain measures with GHG emission reductions sufficient to achieve

the level required to meet the obligations of the Kyoto Protocol or the Kyoto Protocol Implementation Act. Furthermore, expected emission reductions reported in the plans have been revised downward by more than 90 percent between 2007 and 2010.

- 1.88 We noted that, despite allocations of more than \$9 billion, the government has yet to establish the management systems and tools needed to achieve, measure, and report on greenhouse gas emission reductions. Key elements missing include consistent quality assurance and verification systems to report actual GHG emission reductions and clear and consistent financial reporting systems for the measures in the plans.
- 1.89 The 2010 National Inventory Report indicates that national GHG emissions were 31 percent higher than the Kyoto target in 2008. Under the Copenhagen Accord and the 2010 Federal Sustainable Development Strategy, the government has committed to achieving a 17 percent reduction from the 2005 GHG emission level by 2020. If it is to do so, we believe the government will need to address the weaknesses in management practices we have observed with respect to the government's efforts to achieve its commitments under the Kyoto Protocol.

Subsequent events

1.90 This report was originally planned for tabling in May 2011 in accordance with the *Kyoto Protocol Implementation Act*. However, due to the spring 2011 federal election, tabling of the report was delayed until the fall of 2011. As audit work for this chapter was completed in November 2010, our analysis did not include information from the most recent National Inventory Report or the most recent Climate Change Plan for the Purposes of the *Kyoto Protocol Implementation Act*, both of which were released by Environment Canada in May 2011. This information will be analyzed in our next audit to be completed under this mandate.

About the Audit

All of the audit work in this chapter was conducted in accordance with the standards for assurance engagements set by The Canadian Institute of Chartered Accountants. While the Office adopts these standards as the minimum requirement for our audits, we also draw upon the standards and practices of other disciplines.

Objectives

The overall objective of our audit was to determine whether Environment Canada and selected entities have complied with the *Kyoto Protocol Implementation Act* by preparing and implementing annual climate change plans, and by reporting on whether Canada is on track to meet its obligation to reduce its greenhouse gas emissions, under Article 3, paragraph 1, of the Kyoto Protocol, in accordance with the Act.

Our sub-objectives were to determine whether

- Environment Canada, in its 2009 and 2010 climate change plans, has implemented selected recommendations made in the Commissioner of the Environment and Sustainable Development May 2009 report;
- Environment Canada and selected entities have
 - implemented the measures in the annual climate change plans—including funding allocated and spent—by the date projected,
 - reported emission reduction results by measure for 2008 in the 2010 plan, and
 - appropriately designed quality assurance systems for reporting emission reduction results for 2008 in the 2010 plan; and
- Environment Canada can show, through its National Inventory Report, that Canada is on track to meet its obligation to reduce its greenhouse gas emissions, under Article 3, paragraph 1 of the Kyoto Protocol, in accordance with the Act.

Scope and approach

The audit was conducted pursuant to the requirements of the *Kyoto Protocol Implementation Act*, which came into force on 22 June 2007. These requirements are described in subsection 10.1(1) of the Act and provide that we report on progress in implementing the climate change plans and in meeting the Kyoto Protocol obligations as well as any other matters we consider relevant.

Environment Canada is the responsible authority for preparing annual climate change plans under the *Kyoto Protocol Implementation Act*. Environment Canada is also the designated authority responsible for reporting on greenhouse gas emissions to the United Nations Framework Convention on Climate Change (UNFCCC) under the Kyoto Protocol. Therefore, Environment Canada was the lead department included in this audit and has responsibilities that are addressed under all three sub-objectives listed above.

There are other federal departments involved in implementing measures identified in the climate change plans and in meeting Canada's Kyoto target. Under the second sub-objective, the audit included those

departments that have responsibilities for implementing measures that are identified in the climate change plans (2007 to 2010). These responsibilities are sometimes shared and include Agriculture and Agri-Food Canada, the Department of Finance Canada, Natural Resources Canada, Sustainable Development Technology Canada, and Transport Canada. Indian and Northern Affairs Canada is responsible for a measure included in the 2010 climate change plan for the first time but was not included in the scope of this audit.

Statistics Canada is not specifically responsible for the implementation of measures in climate change plans, but it was included in the audit as it collects, analyzes, and supplies information to entities for the purposes of measuring and reporting on greenhouse gas emissions.

For each audit sub-objective, we interviewed key departmental officials in the National Capital Region. We also interviewed other stakeholders and consulted with experts in the field, including the Reporting and Data Analysis Program at the UNFCCC. We reviewed documentation supplied to us by the departments and gathered information from selected departments using a questionnaire.

Criteria

To determine whether Environment Canada has implemented selected recommendations from our 2009 audit, we used the following criteria:				
Criteria	Sources			
Environment Canada's 2009 and 2010 climate change plans fulfill the requirements of subsection 5(1) of the <i>Kyoto Protocol Implementation Act</i> .	 Kyoto Protocol Implementation Act, subsection 5(1) 2009 Spring Report of the Commissioner of the Environment and Sustainable Development, Chapter 2, recommendation 2.9 Environment Canada's response to recommendation 2.9 			
In its 2009 and 2010 climate change plans, Environment Canada describes the uncertainties related to the expected greenhouse gas emission reductions of each measure and for the annual plan as a whole.	2009 Spring Report of the Commissioner of the Environment and Sustainable Development, Chapter 2, recommendation 2.28 Environment Canada's response to recommendation 2.28			
Environment Canada explains in the 2010 climate change plan how it has estimated each of the reported actual greenhouse gas emission reductions for 2008.	2009 Spring Report of the Commissioner of the Environment and Sustainable Development, Chapter 2, recommendation 2.34			
To determine whether Environment Canada and selected entities have imp	Environment Canada's response to recommendation 2.34 lemented measures in climate change plans, we used the following criteria:			
Criteria	Sources			
Environment Canada and selected entities have implemented the measures proposed in the 2007, 2008, and 2009 climate change plans or have indicated why the measure was not implemented and how this will be redressed.	 Kyoto Protocol Implementation Act, subsection 5(1) paragraphs (b), (e), and (f) Performance Reporting: Good Practices Handbook, Treasury Board of Canada Secretariat, 2007 Clean Air Agenda Horizontal Management Accountability and Reporting Framework 			

Environment Canada and selected entities can demonstrate that they have appropriately designed quality assurance systems in place for reporting emission reduction results for 2008 in the 2010 climate change plan.

- Kyoto Protocol Implementation Act, subsection 5(1)(b)(ii)
- Environment Canada's quality assurance and quality control for reporting greenhouse gas emissions sources and sinks to the United Nations Framework Convention on Climate Change, National Inventory Report, 2010
- ISO 14064-1, Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals, International Organization for Standardization, 2006
- ISO 14064-2, Specification with guidance at the project level for quantification, monitoring, and reporting of greenhouse gas emission reductions or removal enhancements, International Organization for Standardization, 2006
- ISO 14064-3, Specification with guidance for the validation and verification of greenhouse gas assertions, International Organization for Standardization, 2006
- GHG Protocol Initiative, World Resources Institute and the World Business Council for Sustainable Development
- 2006 IPCC (Intergovernmental Panel on Climate Change) Guidelines for National Greenhouse Gas Inventories: Volume 1—General Guidance and Reporting; Chapter 6, Quality Assurance/Quality Control and Verification

To determine whether Environment Canada can show that Canada is on track to meet its Kyoto Protocol obligations for reducing greenhouse gas emissions, we used the following criteria:

Criteria	Sources		
Climate change plans prepared by Environment Canada include measures taken that are designed to ensure that Canada meets its obligations under Article 3, paragraph 1 of the Kyoto Protocol, in accordance with the Act.	Kyoto Protocol Implementation Act, section 5(1)(a) Kyoto Protocol, Article 3		
Environment Canada has developed and implemented adequate quality assurance/quality control and verification systems for reporting the required information on greenhouse gas emissions to the United Nations Framework Convention on Climate Change.	 United Nations Framework Convention on Climate Change 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 1—General Guidance and Reporting; Chapter 6, Quality Assurance/Quality Control and Verification Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, Intergovernmental Panel on Climate Change, 2000 Environment Canada's quality assurance/quality control for reporting greenhouse gas emissions sources and sinks to the United Nations Framework Convention on Climate Change, National Inventory Report, 2010 		
The Government of Canada is on track to meet its obligations under Article 3, paragraph 1, of the Kyoto Protocol, as reported by Environment Canada, in accordance with the Act.	 Kyoto Protocol Implementation Act, section 7 Kyoto Protocol, Article 3 United Nations Framework Convention on Climate Change 		

Management reviewed and accepted the suitability of the criteria used in the audit, with the exception of the Department of Finance Canada. Although the Department accepted responsibility for the design and implementation of the Green Levy and the Public Transit Tax Credit, it did not accept responsibility for ensuring appropriately designed quality assurance systems for reporting emission reduction results for 2008 in the 2010 climate change plan—a responsibility that it shares with other departments.

Period covered by the audit

The audit covered the period between June 2007 to November 2010. Audit work was substantially completed on 2 November 2010.

Audit team

Commissioner of the Environment and Sustainable Development: Scott Vaughan

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Appendix List of recommendations

The following is a list of recommendations found in Chapter 1. The number in front of the recommendation indicates the paragraph number where it appears in the chapter. The numbers in parentheses indicate the paragraph numbers where the topic is discussed.

Recommendation Response Preparing the climate change plans 1.42 Environment Canada should Agreed. Environment Canada has made significant annual ensure that future climate change plans improvements to the plans and produces a comprehensive and for the purposes of the Kyoto Protocol detailed document that reflects the government's commitment Implementation Act contain all the to comply with the Kyoto Protocol Implementation Act's information required by the Act information requirements to the furthest extent possible. or clearly state why the plans do not The Commissioner of the Environment and Sustainable do so. (1.9-1.21) Development has identified specific areas where there is room for further improvement, such as strengthening details on implementation of measures. The Department, with the contribution of responsible departments, will seek to address these issues, beginning with the plan for 2011.

Implementing the plans and achieving results

1.43 Environment Canada and departments responsible for implementing measures in the climate change plans should include an explanation in the plans of how measures not implemented will be redressed in terms of greenhouse gas emission reductions. (1.22–1.26)

Agreed. Environment Canada and responsible departments will continue to provide up-to-date information on federal climate change activities. When measures for the previous calendar year have been delayed or not implemented, departments will provide a clear explanation for the change in implementation status.

This recommendation has implications for a number of federal departments, and they have been consulted on this response.

The Government of Canada has been clear that it is moving forward on meeting its commitment to reduce GHG emissions by 17 percent by 2020 compared with 2005 levels. It has replaced its earlier regulatory approach, entitled Turning the Corner, with a new sector-based approach that, where appropriate, aligns with actions taken in the U.S. Significant progress has been made in the electricity and transportation (emission standards for new passenger automobiles and light trucks) sectors, and the actions taken so far by the federal and provincial governments are expected to achieve one quarter of the emission reductions needed by 2020 to meet our commitment of reducing Canada's annual GHG emissions to the target level of 607 million tonnes (Mt).

Recommendation	Response		
	Canada is participating in a global approach under the Cancun Agreements, which were signed by developed and developing countries accounting for over 85 percent of global GHG emissions.		

Establishing management systems

- 1.81 Environment Canada should ensure that future climate change plans are supported by an appropriate management accountability and reporting framework that includes
- clear roles and responsibilities,
- clear goals and objectives for the plans and for the measures,
- an evaluation strategy, and
- ongoing performance measurement that includes transparent financial reporting and quality assurance on greenhouse gas emissions and reductions reported. (1.47–1.56)

Agreed. Environment Canada accepts this recommendation although it is not a requirement under the Kyoto Protocol Implementation Act.

The new Federal Sustainable Development Strategy (FSDS) provides a management and reporting instrument that will outline much of the information recommended by the Commissioner of the Environment and Sustainable Development. The FSDS is a permanent and transparent mechanism that aligns well with the long-term nature of challenges associated with climate change. It will provide an integrated, whole-of-government picture of actions and results on climate change and other environmental priorities. In linking to the government's expenditure planning and reporting system, it also makes transparent the resources associated with climate change initiatives. Finally, the FSDS uses the Canadian Environmental Sustainability Indicators to measure, monitor, and report on progress.

The FSDS will augment core management accountability and reporting instruments operating outside of the Act. These include annual reports on plans and priorities, departmental performance reports, and the evaluation plans of departments consistent with Treasury Board's Policy on Evaluation.

Where appropriate, references to these instruments will be made in the 2011 and future Plans for the Purposes of the Kyoto Protocol Implementation Act. These references will direct interested parties to these additional sources of information.

Departments responsible for implementing measures in the plans have been consulted on this response.

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Recommendation

Response

Reporting financial information

1.82 Environment Canada should ensure that requirements for the reporting of financial information by departments responsible for implementing and reporting on measures in the climate change plans are clear and consistent. These departments should ensure that this financial information is provided in a timely manner. Environment Canada should ensure that financial information, including all funds allocated and spent, is reported for all measures in the annual climate change plans. (1.57–1.62)

Disagreed. Environment Canada does not accept this recommendation.

The Kyoto Protocol Implementation Act is focused on the reporting of emission reductions associated with Government of Canada climate change initiatives and does not include any requirement for financial reporting in the annual plans. Such information is provided to Parliament through the existing Expenditure Management System, including departmental performance reports and reports on plans and priorities. Further, these instruments of financial reporting will be supplemented by additional reporting to Parliament under the new Federal Sustainable Development Strategy, which is designed to link with the Expenditure Management System and will include extensive reporting on efforts to reduce GHG emissions.

If there is a need to improve financial reporting on environmental activities, such as reducing GHG emissions, it would be more effective to do so through instruments designed for financial reporting, as opposed to the annual plans under the Kyoto Protocol Implementation Act.

Departments responsible for implementing measures in the plans have been consulted on this response.

Recommendation

Response

Establishing quality assurance and quality control systems

- 1.83 Departments responsible for implementing and reporting on measures in the climate change plans—including Natural Resources Canada, Transport Canada, the Department of Finance Canada, and Environment Canada—should develop and implement a quality assurance and quality control system for reporting actual greenhouse gas emission reductions, measured or estimated against a baseline. This should include
- publishing complete and transparent information regarding the analysis underlying each measure and its corresponding baseline, the calculation methods for the reductions, and how the criterion of additionality has been defined and met; and
- documenting the accuracy of the actual greenhouse gas emission reductions by providing an uncertainty range for each measure and for the total of all measures, for each remaining year of the Kyoto Period (2009 to 2012). This information should be published in the next climate change plans. (1.64–1.76)

Agreed. Beginning with the 2011 plan, Environment Canada will work with other departments, wherever possible, to provide greater clarity on the consistency of quality assurance and verification systems by asking that departments preparing greenhouse gas (GHG) estimates clearly describe

- the analysis, including methodology and assumptions, underlying the measures;
- the process that departments used to develop the baseline(s);
- the calculation methods for GHG reductions; and
- how the criterion of additionality has been defined and met.

In addition, departments preparing GHG estimates will be asked to provide a range for the actual GHG reductions associated with each measure. Environment Canada will also investigate ways through which to build upon the sensitivity analyses currently underpinning the reference case and alternative scenario for the total of all measures.

2

Assessing Cumulative Environmental Effects of Oil Sands Projects



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Assessing Cumulative Environmental Effects of Oil Sands Projects

Main Points

What we examined

Project-based environmental assessment is used to predict the adverse environmental effects of a project before it is carried out and to identify measures to mitigate those effects. Under the Canadian Environmental Assessment Act, projects must undergo environmental assessment when a federal department or agency (referred to as a responsible authority) has decision-making authority or is the project proponent, regulator, land manager, or funding source. Eligible projects include the construction, operation, modification, decommissioning, or abandonment of a physical work, or other physical activities specified by regulation.

The Act further requires that the environmental assessment of each project under review consider cumulative environmental effects. The cumulative environmental effects of a project are environmental effects arising from a single project under review, combined with the effects of other projects or activities located in the same geographic region. The assessment of multiple-project environmental effects combines the environmental effects of projects that have been in operation for years or decades, the projected environmental effects of the specific project under review, and the potential environmental effects of projects that have not yet begun operation but will do so in the future. While the environmental effects of a single project may not be significant when assessed in isolation, the combined effects of multiple projects on water, air, land, and wildlife may have significant adverse environmental effects.

We examined whether the federal government has considered cumulative environmental effects of major oil sands projects in northern Alberta, in accordance with the environmental assessment process established by the Act. This examination included the role of selected federal entities in the environmental assessment process, along with their submissions and other actions related to their participation in joint review panels. The oil sands region of northern Alberta was selected because of the high concentration of major projects that are operating or planned in the area, where the potential for cumulative effects could be significant. We did not audit the roles

of the independent joint review panels and the provincial government in the environmental assessment of oil sands projects, or those of regional organizations that monitor and report on cumulative environmental effects in the region.

Audit work for this chapter was substantially completed on 30 April 2011.

Why it's important

Considering cumulative environmental effects as part of the environmental assessment process is important to protect the environment in areas where multiple large-scale projects operate or are planned. Assessing cumulative effects requires information on potentially affected ecosystems, including baseline information and the carrying capacity of given terrestrial and aquatic ecosystems, so that federal authorities can appropriately analyze the environmental effects of a project in relation to other projects. Failure to predict cumulative environmental effects and incorporate appropriate mitigation measures into the design and implementation of a project before the project is constructed can lead to significant environmental degradation as well as increased costs.

What we found

- Incomplete environmental baselines and environmental data monitoring systems needed to understand changing environmental conditions in northern Alberta have hindered the ability of Fisheries and Oceans Canada and Environment Canada to consider in a thorough and systematic manner the cumulative environmental effects of oil sands projects in that region.
- Fisheries and Oceans Canada, Environment Canada, and the Canadian Environmental Assessment Agency did not adapt the terms of reference for subsequent environmental assessments as a means of reducing gaps in the information needed to fully consider changing environmental conditions.
- In September 2010, the government established the Oil Sands Advisory Panel, whose mandate was to document, review, and assess the current body of scientific research and monitoring in the northern Alberta oil sands region and, in December 2010, the Panel issued its report. In response, the federal government committed to establish, with its key partners, a world-class environmental monitoring system for the lower Athabasca River basin.

The Agency has responded. The Agency agrees with our recommendations. Its detailed responses follow the recommendations in the chapter.

Introduction

The oil sands region of northern Alberta

- 2.1 Northern Alberta is the location of the second-largest known oil reserve in the world, the oil sands, which cover an area of approximately 140,000 square kilometres. Development of this natural resource began in 1967, using two methods of extracting the oil. Surface mining is generally used where the bitumen is within 75 metres of the surface. This is the case for deposits around Fort McMurray, which represents about three percent of the total oil sands area. Underground mining, commonly referred to as in situ or steam-assisted gravity drainage, is used to extract deeper bitumen.
- 2.2 As of January 2011, there were five surface mining projects in production within the surface mineable area (Exhibit 2.1). One additional project was under construction and four more have been proposed. A number of underground mining projects have also been planned for this area; one of these was already in production in January and several others were in various stages of planning, construction, or pre-operation. In terms of barrels of oil per day, the industry predicts that total oil sands production from surface and underground sources combined will more than double within the next 15 years. Given the potential impact of such major extraction projects on the environment, the provincial and federal governments normally require that these projects undergo an environmental assessment before they can proceed.

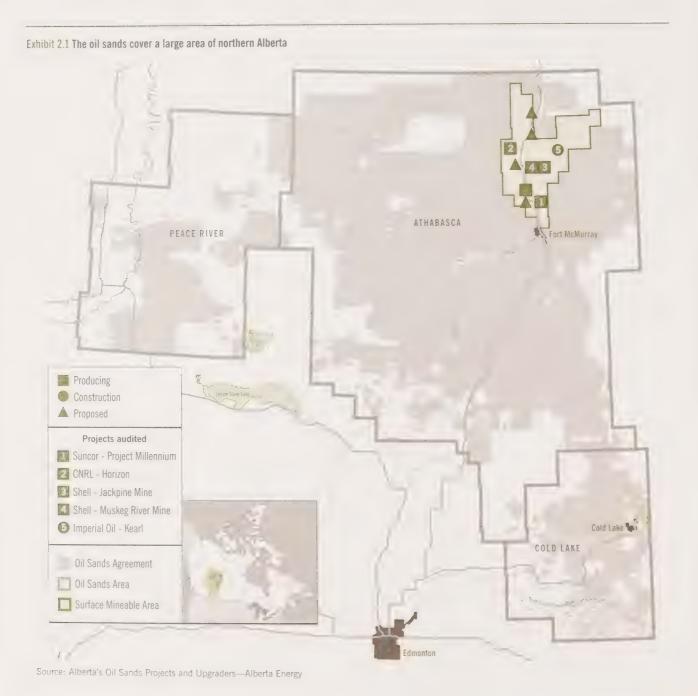
Environmental assessment of projects

- 2.3 Under the Constitution, the federal and provincial governments share responsibility for protecting the environment. Provinces have primary jurisdiction over natural resource sectors, such as forestry, mining, and hydroelectric development. The federal government is responsible for fisheries, shipping, interprovincial trade and commerce, and criminal law. It also has residual powers related to areas not specifically assigned to the provinces.
- Assessment Act (the Act) states that "environmental assessment provides an effective means of integrating environmental factors into planning and decision-making processes in a manner that promotes sustainable development." Section 4(1)(a) of the Act states that one of its purposes is "to ensure that projects are considered in a careful and

Oil sands and bitumen—Generally a mixture of bitumen, sand, and clay. Bitumen is a naturally occurring viscous mixture of hydrocarbons that contains high levels of sulphur and nitrogen compounds. In its natural state, bitumen is not recoverable at a commercial rate through a well because it is too thick to flow. It must either be mined or extracted by processes that generally involve heating the sand and the oil it contains to enable it to flow.

precautionary manner before federal authorities take action in connection with them, in order to ensure that such projects do not cause significant environmental effects."

2.5 The federal environmental assessment process begins when the need for an environmental assessment is identified under the Canadian Environmental Assessment Act. Section 5(1) of the Act requires an environmental assessment to be carried out when a federal department



Project—The construction, operation, modification, decommissioning, or abandonment of a physical work, or other physical activities specified by regulation.

Proponent—The person or organization that proposes the project.

Comprehensive study—An environmental assessment used for large-scale or complex projects likely to have significant effects on the environment, that may generate public concerns, and that are subject to the Comprehensive Study List Regulations under the Canadian Environmental Assessment Act.

is involved in a project as project proponent, regulator, land manager, or funding source. Before exercising its powers in relation to a project, the responsible authority must ensure that the environmental assessment is performed and that it takes into account the significance of all harmful or undesirable effects on the environment that are expected to remain after proposed mitigation measures are put into place. There are three types of environmental assessments in use—screenings, comprehensive studies, and review panels. The large-scale oil sands projects considered in our audit were subject to either a federal—provincial joint review panel of independent experts or a comprehensive study. Environmental assessments are carried out in a series of interrelated phases:

- · scoping,
- · analyzing,
- identifying mitigation measures,
- · evaluating the significance of effects, and
- following up.

Cooperation agreements, such as the Canada–Alberta Agreement on Environmental Assessment Cooperation, govern situations where provinces also need to carry out an environmental assessment. Exhibit 2.2 describes roles and responsibilities for cooperative environmental assessments.

Cumulative environmental effects

- **2.6** A project-based environmental assessment identifies the potential effects of a particular project on the environment. Since the environmental effects are rarely isolated from those of adjacent projects or activities, the Act requires that the assessment consider the project's incremental impact on these cumulative or combined effects.
- 2.7 While the Act requires federal authorities (Exhibit 2.2) to consider cumulative environmental effects, it does not define the term. Two publications of the Canadian Environmental Assessment Agency provide guidance for federal departments on assessing cumulative effects: the 1999 Cumulative Effects Assessment Practitioners' Guide and the 1994 reference guide Addressing Cumulative Environmental Effects. The Practitioners' Guide describes how these effects can be considered for each phase of an environmental assessment. It also identifies ways in which they can occur, including

- physical-chemical transport—through air emissions, waste water, and sediment;
- nibbling loss—gradual disturbance and loss of land and habitat;
- spatial and temporal crowding—many projects carried out within too small an area and in too brief a period of time; and
- growth-inducing potential—current actions that bring about further actions.
- This guidance underscores the complex nature of cumulative environmental effects based on the interaction of many factors, often over long periods of time.
- Some federal authorities have issued their own guidance to supplement that of the Agency. For example, in 2001, Fisheries and Oceans Canada introduced its CEAA Guide—Applying the Canadian Environmental Assessment Act for the Fish Habitat Management Program, which described the steps for conducting an environmental assessment, including departmental roles and responsibilities. Environment Canada plans to include a section on considering cumulative environmental effects in its updated internal environmental assessment guidance.

Roles and responsibilities

- 2.10 Multiple federal and provincial bodies share roles and responsibilities for the environmental assessments of major oil sands projects (Exhibit 2.2). Federal departments and agencies are involved throughout the environmental assessment process, including in situations where a project is referred to a review panel. Federal responsibilities include contributing to the setting of terms of reference for proponents to prepare an environmental impact statement, reviewing and analyzing that statement, and providing input into assessment reports produced by either the responsible authority or a federal-provincial joint review panel.
- 2.11 Other federal acts set out additional responsibilities for ongoing monitoring and assessment of environmental effects. These responsibilities complement and potentially support the environmental information and assessment requirements under the Canadian Environmental Assessment Act. Section 4 of the federal Department of the Environment Act states that the Minister of the Environment is responsible for the preservation and enhancement of the quality of the natural environment, including water, air, and soil quality. The minister is also responsible for coordinating the policies and programs

Terms of reference—A document that outlines

of the Government of Canada for preserving and enhancing the quality of the natural environment. Further, Section 44 of the Canadian Environmental Protection Act, 1999 requires the Minister of the Environment to establish, operate, and maintain "a system for monitoring environmental quality." According to the Act, "environment" means the components of the Earth, and environmental quality includes the health of ecosystems.

Exhibit 2.2 Environmental assessments of major oil sands projects are a cooperative federal-provincial undertaking

Organization	Role and responsibilities			
Inder the Canada–Alberta Agreement on Environmental Assessment Cooperation:				
Lead party (Alberta Environment for most oil sands projects)	 Issues the terms of reference for the proponent (with input from the other party) and ensures that the environmental information needs of the other party are met. Coordinates requests to proponents for additional information. 			
Other party (Federal government for most oil sands projects — coordinated by the Canadian Environmental Assessment Agency)	 Contributes to the terms of reference for the proponent and confirms to the lead party that the terms of reference meet its requirements. Reviews and comments on the proponent's environmental impact statement requesting additional information where necessary. 			
Proponent	 Prepares the environmental impact statement according to the terms of reference and submits it to federal and provincial authorities, providing additional information when requested. 			
Under the Canadian Environmental Asses	sment Act:			
Canadian Environmental Assessment Agency	 Administers the Canadian Environmental Assessment Act. Promotes high-quality assessment through training and guidance and provides administrative and advisory support. As of July 2010, ensures that an environmental assessment is conducted for a 			
	comprehensive study, except for those instances where the Canadian Nuclear Safety Commission or the National Energy Board are responsible authorities.			

Exhibit 2.2 Environmental assessments of major oil sands projects are a cooperative federal-provincial undertaking (continued)

Organization	Role and responsibilities	
Federal authorities (Environment Canada for all of the oil sands projects selected for this audit. Natural Resources Canada, Health Canada, Parks Canada, and Indian and Northern Affairs Canada were not included in the scope of this audit but were also federal authorities for some or all of the selected oil sands projects.)	Participate in the environmental assessment process, including joint review panels or comprehensive studies, as expert departments for a project.	
Joint review panels (Created by the federal and provincial governments and consist of independent panel members. Responsible authorities recommend the creation of a review panel for projects with likely adverse environmental effects or where public concerns may warrant it.)	 Impartially and objectively review and assess the environmental effects of a project. Hold public hearings, and summarize and report on their assessment of the project, including cumulative environmental effects, and present recommendations to proponents and government. 	
Other organizations		
Regional organizations (Organizations whose members include federal and provincial governments, proponents, and other stakeholders — Exhibit 2.4)	Develop frameworks, and monitor and report on environmental effects in the oil sands region.	

Sources: Canadian Environmental Assessment Agency website ("About the Agency"), Canadian Environmental Assessment Act, Canada—Alberta Agreement on Environmental Assessment Cooperation

Focus of the audit

- 2.12 The objective of the audit was to determine whether the federal government has considered the cumulative environmental effects of major oil sands projects in northern Alberta according to the Canadian Environmental Assessment Act.
- 2.13 We examined the federal government's role in assessing large-scale oil sands projects in northern Alberta that were subject to either a joint review panel or a comprehensive study under the Canadian Environmental Assessment Act (Exhibit 2.3). In particular, we examined whether the federal government has considered the cumulative environmental effects of projects in the oil sands region of northern

Alberta in discharging its responsibilities. We looked at the roles of selected federal organizations in the environmental assessment process, including

- their review and analysis of environmental information, and
- their submissions and other actions for their participation in joint review panels and for comprehensive studies.

2.14 We selected the oil sands region of northern Alberta because the number of environmental assessments of large projects carried out there is among the highest in Canada. We focused on the work of Fisheries and Oceans Canada (as a responsible authority), Environment Canada (as a key expert federal authority), and the Canadian Environmental Assessment Agency (as the federal administrator of environmental assessment activities). We did not audit the roles of the independent joint review panels, the provincial government, or regional organizations. We also did not audit the underlying scientific evidence used by federal authorities to support their deliberations, analyses, submissions, and reports.

Exhibit 2.3 Five large oil sands projects in northern Alberta underwent environmental assessments from 1999–2007

Date of assessment	Project name	Type of assessment
1999	Project Millennium	Comprehensive study
2004	Horizon Oil Sands Project	Joint review panel
2004	Jackpine Mine Project	Joint review panel
2006	Muskeg River Mine Expansion	Joint review panel
2007	Kearl Oil Sands Project	Joint review panel

Source: Canadian Environmental Assessment Agency

2.15 More details about the audit objective, scope, approach, and criteria are in About the Audit at the end of this chapter.

Observations and Recommendations

Information for assessing cumulative environmental effects

Baseline data—A description of existing environmental, social, or economic conditions at and surrounding a project or area.

Carrying capacity—The maximum level of use or activity that an ecosystem can sustain without negative consequences. Carrying capacity is generally determined by scientific analysis.

Information gaps hinder the analysis of cumulative environmental effects

2.16 As part of our audit, we examined whether Fisheries and Oceans Canada and Environment Canada had adequate information to consider the cumulative environmental effects of the development of oil sands projects in northern Alberta. To assess the cumulative effects of a project, federal authorities need environmental data and scientific information regarding potentially affected ecosystems—for example, baseline data and information on carrying capacity. The departments need to be able to review and analyze a project proponent's environmental impact statement, and to contribute to assessment reports produced by either the responsible authority or a joint review panel. As stated in Fisheries and Oceans Canada's CEAA Guide— Applying the Canadian Environmental Assessment Act for the Fish Habitat Management Program, its officials are to get information from proponents on the existing environment of the area under study. In addition, the proponent's environmental impact statement must identify potential environmental effects—including cumulative effects—and their significance.

2.17 As part of our audit, we looked to see whether the government had the information needed for assessing environmental impact statements. We also examined whether the federal government had reviewed the adequacy of information provided to joint panels established to review and assess the environmental impacts of proposed oil sands projects.

2.18 Environmental impact statements reviewed before creation of a joint review panel. We found that, for the projects we examined, Fisheries and Oceans Canada and Environment Canada reviewed the proponents' environmental impact statements in the two- to three-year period from the time the federal environmental assessment was triggered and a responsible authority was identified up to the creation of a joint review panel. They did so according to their responsibilities under the Canada—Alberta Agreement on Environmental Assessment Cooperation. This work is an important part of the federal environmental assessment process. Environmental impact statements are based on federally reviewed terms of reference and provide key information for the preparation of a comprehensive study or for use by subsequent joint review panels. The federal authorities' review of the environmental impact statements repeatedly identified information gaps and raised concerns about the assumptions and models used to

predict environmental effects of the projects. Often, federal authorities requested further information or clarification from the proponents, which they then reviewed and analyzed.

- 2.19 Information gaps and concerns raised in submissions to joint review panels. We found that, once a joint review panel was in place, federal authorities prepared submissions for the joint review panel public hearings. Between 1999 and 2007, these submissions, as well as those for the comprehensive study carried out on the 1999 Project Millennium, repeatedly pointed to gaps in environmental data and scientific information related to the potential cumulative impact of oil sands projects on water quantity and quality, fish and fish habitat, land and wildlife, and air. Federal officials told us that the responsibility for collecting environmental information is shared by the federal and provincial government, which creates a challenge for assessment of cumulative effects.
- **2.20** Areas of concern raised by federal authorities included, for example, insufficient information on the potential acidification of water bodies in northern Saskatchewan; a lack of baseline data for assessing the impact of projects on wildlife corridors; and uncertainties and incomplete information regarding the impacts of stream flow rates, tailings, and other water issues, such as the potential impact of polycyclic aromatic hydrocarbons extending as far as Great Slave Lake.
- **2.21** Specific concerns federal authorities raised in some key areas include the following:
 - · Water quantity. At the time of the 1999 comprehensive study on Project Millennium, the oil sands water monitoring program was in its early stages. As a result, the study could not yet assess the effects on stream flow in the region. In 2004, Fisheries and Oceans Canada expressed concerns about the modeled versus actual water flow predictions due to incomplete baseline information and doubts about the models used. In 2006, Environment Canada raised concerns about ongoing scientific uncertainties and data gaps related to stream flows, while Fisheries and Oceans Canada noted that it lacked sufficient information about water withdrawals to assess the cumulative effects of projects. In response to the 2004 Horizon and Jackpine joint review panel reports, Fisheries and Oceans Canada and Alberta Environment subsequently produced a water management framework regarding stream flows and water withdrawals from the lower Athabasca River. The framework is intended to guide regulators in their decision making regarding

Acidification—Build-up of excess sulphuric and nitric acids in the soil, waters, and air.

Tailings—A by-product of mining operations that is discharged and contained in large earthen structures above ground (tailings ponds) or in former mine pits awaiting reclamation.

Polycyclic aromatic hydrocarbons— Environmental contaminants that are formed when combustion of organic materials, such as wood or fossil fuels, is incomplete. These hydrocarbons are found in crude oil and products such as bitumen, asphalt, coal tar pitch volatiles, and unrefined or mildly refined mineral oils.

Stream flows and water withdrawals—The flow of water in streams, rivers, and other channels. Successful feeding, migration, rearing, and overwintering of fish species depend on sufficient stream flows (the instream flow needs). Withdrawal of water during natural low-flow conditions in a river is of concern due to the potential for water levels to drop below the in-stream flow needs.

Fish tainting—Abnormal odour or flavour in fish.

- the cumulative effects of withdrawing water. Phase 1 was carried out in 2007 and Phase 2 was scheduled to have been carried out in January 2011, but Fisheries and Oceans Canada officials informed us that the revised target for completion of the Phase 2 framework document is early 2012.
- Water quality. In 2004, Environment Canada noted deficiencies in baseline information as well as data gaps in on-site water quality sampling. That same year, Fisheries and Oceans Canada noted that the impact of water quality on local fish populations was poorly understood, in particular fish tainting and overall fish health. Further, Fisheries and Oceans Canada flagged the risk of possible seepage of tailings ponds (containing oil sands byproducts) into Jackpine Creek as well as overall uncertainties about whether the water quality in end-pit lakes—engineered lakes to be created in mined-out pits—could be high enough to produce viable ecosystems. In 2006, Environment Canada raised concerns about the limited number of under-ice water quality samples taken.
- Fish and fish habitat. The 1999 comprehensive study report noted the lack of baseline information on invertebrates in the region and on their contribution to the condition of fish habitat. In 2004, Fisheries and Oceans Canada raised similar concerns about aquatic species information as well as the cumulative environmental effects of projects on fish and fish habitat due to successive water withdrawals and the elimination of some watercourses. In 2006 and 2007, the Department noted further lack of data on fish habitat and uncertainties about ways to compensate for lost habitat. Fisheries and Oceans Canada reported that it had difficulty getting a clear picture of fish populations at the regional level due to a lack of data, a lack of reference areas and sites, the limited number of years used to gather information, and changes in sampling.
- Land and wildlife. In 1999, Environment Canada noted that wildlife populations and wildlife movements were poorly understood, while the potential impact of the oil sands on biodiversity was unknown. That same year, Environment Canada recommended creating a comprehensive monitoring program to develop baseline data to determine the effects of oil sands projects on wildlife and biodiversity. Five years later, Environment Canada found that the lack of information about the characteristics of wildlife migration within boreal forests remained. Besides gaps in baseline information, Environment Canada also noted that the

absence of regional information continued to hamper assessments. In 2006 and 2007, the Department found the proponent was unable to complete a regional cumulative effects assessment for old growth forests and bird populations because of incomplete regional habitat mapping.

- Air. The 1999 comprehensive study report noted that provincial trans-boundary effects of projects were not addressed because of the absence of in-depth analysis. At the same time, Environment Canada stated that available data suggested that some environmental limits for air emissions in the area would be exceeded.
- 2.22 Through their submissions to joint review panels, Fisheries and Oceans Canada and Environment Canada outlined their concerns about the completeness and uncertainty of environmental data and the implications for understanding fully the cumulative environmental effects in the region.

Cooperative efforts have not resulted in closing information gaps

- 2.23 The 2003 amendments to the Canadian Environmental Assessment Act encouraged federal authorities to cooperate with provinces and other bodies in regional studies while meeting their obligations under the Act. Joint review panels have also underscored the importance of partnerships between federal authorities and regional organizations. Since the late 1990s, several regional organizations, working groups, and strategies in the oil sands region of northern Alberta have been created, with the objective of monitoring cumulative environmental effects of development in the region (Exhibit 2.4). Federal authorities participate in those regional initiatives.
- 2.24 Federal authorities maintained membership in these regional organizations with an expectation that these cooperative efforts would reduce identified information gaps, improve scientific understanding, and disseminate environmental data. For example, we noted that in its report for Project Millennium, Fisheries and Oceans Canada referred to the Government of Alberta's Regional Sustainable Development Strategy and the Regional Aquatics Monitoring Program as initiatives to reduce identified information gaps.
- 2.25 We found that while the federal government continued to work with regional organizations, government departments acknowledged that gaps in the information needed to consider cumulative environmental effects still remained. For example, in 2004, Environment Canada noted that the rate of oil sands project

development was potentially exceeding the ability of the Cumulative Environmental Management Association (CEMA) and the Regional Sustainable Development Strategy to introduce effective management systems to set environmental thresholds or objectives. Similarly, the joint review panel for the 2007 Kearl Oil Sands Project stated that while the success of CEMA is critical, ultimately, government regulators are responsible for managing environmental effects in the region.

Exhibit 2.4 Federal authorities have participated in regional initiatives to monitor and report on cumulative environmental effects

Term	Description	
Regional Sustainable Development Strategy (RSDS)	 RSDS was created by the Government of Alberta in 1999 to deal with the question of whether the environment could handle the level of projected growth in oil and gas activities in the region. 	
	• It identified and prioritized 72 environmental issues within the oil sands region that should be studied in light of the projected growth. The issues were divided into a list of 14 themes and 3 priority categories (information gaps and urgency; information gaps and work under way; and information gaps, work under way, and lower level of urgency).	
	Federal RSDS partners included Environment Canada and the Canadian Environmental Assessment Agency.	
Cumulative Environmental Management Association	 CEMA is a multi-stakeholder group created in 2000 to deal with 37 of the issues identified by the RSDS. 	
(CEMA)	 It provides recommendations to regulators on managing potential cumulative environmental effects using an array of environmental management tools, such as environmental limits or thresholds. 	
	 Federal members participate in working groups. Members include the Canadian Environmental Assessment Agency, Environment Canada, Fisheries and Oceans Canada, Health Canada, Natural Resources Canada, and Parks Canada. 	
Regional Aquatics Monitoring Program (RAMP)	RAMP is an industry-funded, multi-stakeholder environmental monitoring program started in 1997.	
	 It integrates aquatic monitoring activities across different components of the aquatic environment, different geographical locations, oils sands projects, and other developments in the Athabasca oil sands region. The aim is to make it possible to identify and address long-term trends, regional issues, and potential cumulative effects related to oil sands projects and other development. 	
	 It monitors aquatic environments in the Athabasca oil sands region to detect and assess cumulative effects and regional trends. It collects baseline data, collects and compares data against which predictions appearing in environmental impact assessments can be assessed and collects data that satisfies the monitoring requirements set as conditions in regulatory approvals of oil sands projects and other developments. 	
	 Federal members of the steering committee are Environment Canada, Fisheries and Oceans Canada, and Health Canada. 	

Source: Alberta Environment, CEMA and RAMP websites

Terms of reference for environmental assessments do not make use of past experience

- 2.26 As part of our audit, we examined whether Fisheries and Oceans Canada, Environment Canada, and the Canadian Environmental Assessment Agency had established terms and conditions in the early planning phase of environmental assessments to guide the assessment of the cumulative environmental effects associated with the development of oil sands projects in northern Alberta.
- **2.27** The Canadian Environmental Assessment Act requires responsible federal authorities to determine the scope and factors to be considered for an environmental assessment. In the case of cooperative environmental assessments of oil sands projects, the Canada–Alberta Agreement on Environmental Assessment Cooperation sets out the roles and responsibilities for preparing the terms of reference to proponents (Exhibit 2.2).
- 2.28 The terms of reference to proponents are important because they outline the information the federal government requires the project proponent to provide in its environmental impact statement. This information is meant to allow the federal government to fully consider the cumulative effects associated with the development of the oil sands projects. The proponent's environmental impact statement is also a key source of information for the joint review panels. We examined whether the federal authorities had provided clear input to the development of the terms of reference and had confirmed that they could meet their needs. We also examined whether federal authorities would monitor the results of a cumulative effects assessment to consider whether, in fact, the terms of reference for that assessment actually did meet their needs or whether they should be modified for subsequent assessments of cumulative environmental effects.
- 2.29 We found that the Canadian Environmental Assessment Agency, Fisheries and Oceans Canada, Environment Canada, and other federal departments gave comments and suggestions on the terms of reference document before it was issued by the lead party. In the case of the Project Millennium comprehensive study, Fisheries and Oceans Canada—the federal responsible authority—confirmed that the terms of reference met the federal requirements under the Act. However, while federal authorities commented on the draft terms of reference for the four projects referred to a joint review panel, the federal government did not confirm, as required by the Canada—Alberta Agreement on Environmental Assessment Cooperation, that the final terms of reference met federal requirements. In some cases,

Environment Canada notified the Canadian Environmental Assessment Agency that the final terms of reference did not incorporate its comments, including its information requirements for assessing cumulative effects. We were not provided evidence that the Agency resolved Environment Canada's concerns, for example, by issuing supplemental terms of reference as allowed by the Canada–Alberta Agreement.

- 2.30 We also found that the terms of reference issued to proponents of oil sands projects from 1999 to 2007 were generic and did not change from one project assessment to the next. For the five projects we reviewed, the federal government did not take the opportunity to modify terms of reference in later projects to deal with key concerns previously raised by federal authorities, in areas such as water quantity and quality, fish and fish habitat, land and wildlife, and air. In our opinion, federal authorities should have used the sound management practice of adapting terms of reference over time in order to address identified gaps in information being provided to them.
- 2.31 Recommendation. The Canadian Environmental Assessment Agency should assess lessons learned from previous cumulative environmental effects assessments of oil sands projects to identify good practices. These lessons learned should serve as a basis for adjusting terms of reference to proponents for future assessments of cumulative effects.

The Agency's response. Agreed. The Agency has already initiated improvements in the development of the terms of reference to proponents. This includes working with the provinces and other departments to ensure that the terms of reference to proponents take into account experience gained from previous environmental assessments. The Agency will continue to apply this approach for future projects as it strives to provide Canadians with world-class environmental assessments.

2.32 Recommendation. The Canadian Environmental Assessment Agency should review and update its guidance, including its 1999 Cumulative Effects Assessment Practitioners Guide, to take into account recent practices within Canada, including lessons learned from past assessments, as well as lessons from elsewhere regarding assessments of cumulative environmental effects.

The Agency's response. Agreed. The Agency will review its practitioner's guidance to ensure that it reflects best practices in cumulative effects assessment from Canada and around the world.

The review will focus on recent knowledge, making use of both practitioners' experience and relevant findings from research studies. Developed for use by government and private sector practitioners, the Agency guidance will support the assessment of cumulative effects under the Canadian Environmental Assessment Act.

Departments responded to an environmental petition concerning northern Alberta oil sands projects

- 2.33 As part of our audit, we reviewed the current status of government actions taken in response to an environmental petition received concerning the oil sands projects of northern Alberta. We wanted to see whether the departments had made further progress since the petition was received.
- 2.34 We found that in 2008, the federal government responded to an environmental petition that asked for the status of the federal government's response to joint review panel recommendations for oil sands projects. In response to the petitioner's concern about recommendations calling for additional monitoring, the government said it was "following up with the proponent to ensure compliance" with respect to some of the monitoring reports required by conditions of Fisheries Act authorizations for the harmful alteration, disruption, or destruction of fish habitat issued in 2004 for the Horizon Oil Sands Project. In summer 2010, Fisheries and Oceans Canada officials told us that the reports had been received and were being reviewed.

Recent federal government initiatives

Environmental petition—A process created in 1995 through an amendment to the Auditor

General Act. It is a formal, yet simple, way for

Canadians to get responses from federal ministers to their questions, concerns, and

requests on environmental issues that are within the federal government's mandate. More

nettons e

information is available at www.oag-bvg.gc.ca/

- 2.35 Subsequent to the period covered by the audit, in September 2010, the federal government created an Oil Sands Advisory Panel on water monitoring for the lower Athabasca River basin and connected waterways. Its mandate was to
 - · document, review, and assess the current body of scientific research and monitoring; and
 - · identify strengths and weaknesses in the scientific monitoring, and the reasons for them.

2.36 In December 2010, the Panel reported the results of its work. It found that Canadians lacked a first-class, state-of-the-art monitoring system in the oil sands region. The Panel observed that, despite the myriad programs ongoing in the oil sands region, there was no evidence of science leadership to ensure that monitoring and research activities were planned and performed in a coordinated way, and no evidence that the vast quantities of data were analyzed and interpreted in an integrated manner. Similarly, the Panel found there

was a lack of leadership on reporting on oil sands environmental performance across environmental components, such as water, air, and land.

- 2.37 However, the Panel found that, with the level of research, monitoring, and environmental assessment data that has been collected, and with the commitment of stakeholders, current activities could be transformed into a system providing credible data for decisions. It said that such a system would allow Canadians to know the current conditions and trends in the oil sands ecosystem and would encourage the necessary foresight to prevent environmental degradation.
- 2.38 The Panel recommended that concerned jurisdictions and stakeholders together develop a shared national vision and management framework with aligned priorities, policies, and programs. It said that the basis of the vision and management framework would include an approach that is holistic and integrated, adaptive, scientifically credible, transparent, and accessible.
- 2.39 In March 2011, the federal government unveiled Phase I of its plan for a world-class system for monitoring surface water quality. The federal government acknowledged that the current monitoring approach was fragmented, inconsistent, and lacking in integration. In its plan, the government concluded that monitoring activities "did not deliver data of sufficient quantity or quality to detect or quantify the effects of oil sands development" and therefore, "strategic decisions for environmental protection (including water quality) and industry sustainability cannot be made under such conditions."
- 2.40 The federal government has committed itself, with its partners, to improving the monitoring system in several integrated phases. In Phase 1, the plan identifies a specific number of water monitoring stations to be located between Fort McMurray and the Peace—Athabasca Delta to obtain a better understanding of physical and chemical stressors affecting the system and improving knowledge of baseline conditions. Phase 2 will identify key biological and ecological indicators to be monitored and used to assess local and regional impacts, including cumulative effects.

Conclusion

- 2.41 We have concluded that incomplete environmental baselines and environmental data monitoring systems needed to understand changing environmental conditions in northern Alberta have hindered the ability of Fisheries and Oceans Canada and Environment Canada to consider in a thorough and systematic manner the cumulative environmental effects of oil sands projects in that region.
- **2.42** We are encouraged by the government's commitments in response to the work of the Oil Sands Advisory Panel. We will monitor the government's progress in putting into effect monitoring systems in keeping with the principles set out by the Panel.

About the Audit

All of the audit work in this chapter was conducted according to the standards for assurance engagements set by The Canadian Institute of Chartered Accountants. While the Office adopts these standards as the minimum requirement for our audits, we also draw upon the standards and practices of other disciplines.

Objective

The objective of our audit was to determine whether the federal government (primarily Fisheries and Oceans Canada as a responsible authority, Environment Canada as a federal authority with expert knowledge, and the Canadian Environmental Assessment Agency as the federal administrator of environmental assessment activities) has considered the cumulative environmental effects of major oil sands projects in northern Alberta under the Canadian Environmental Assessment Act.

Scope and approach

We examined the federal government's assessments of cumulative environmental effects carried out for all of the oil sands projects in northern Alberta that were subjected to either a comprehensive study or a joint review panel and where the environmental assessment process had been completed. Our examination included determining whether the federal government had put in place the necessary processes to support the analysis of cumulative environmental effects. The projects we examined were Project Millennium (1999 comprehensive study), the Horizon Oil Sands Project (2004 joint review panel), the Jackpine Mine Project (2004 joint review panel), the Muskeg River Mine Expansion (2006 joint review panel), and the Kearl Oil Sands Project (2007 joint review panel).

We did not audit the roles of the independent joint review panels and the provincial government, or those of regional organizations that monitor and report on cumulative environmental effects in the region.

Our work consisted of reviewing documentation from the federal government's assessment of cumulative environmental effects for the projects examined, supplemented with interviews with headquarters and regional officials responsible for the assessment of the selected projects. We did not audit the underlying scientific evidence used by federal authorities to support their deliberations, analysis, submissions, and reports.

Additional interviews were carried out with those responsible for coordinating environmental assessment within each organization as well as with departmental experts in water, fish habitat, air, and other related environmental issues, as required. Third-party and stakeholder interviews were also carried out as required.

We also reviewed the federal government's 2008 response to environmental petition 263, which asked federal departments about the status of recommendations in the reports of oil sands joint review panels.

 A Reference Guide for the Canadian Environmental Assessment Act: Addressing Cumulative Environmental Effects, Canadian Environmental Assessment Agency, 1994

 Cabinet Directive on Implementing the Canadian Environmental Assessment Act, 2005

Cooperation, 1999 and 2005

· Canada-Alberta Agreement on Environmental Assessment

Criteria

Criteria

Criteria

Sources

Canadian Environmental Assessment Act, we used the following criteria:

Criteria

Sources

Canadian Environmental Assessment Act, section 16(1) (a) and (b) and section 16.2

Departmental Assessment Act and related policies, regulations, and guidance.

Canadian Environmental Assessment Act and related policies, regulations, and guidance.

Canadian Environmental Assessment Act, canadian Environmental Assessment Act, canadian Environmental Assessment Act, canadian Environmental Assessment Agency, updated 2007

Cumulative Effects Assessment Agency, 1999

To determine whether federal authorities have considered the cumulative environmental effects of major oil sands projects

Management reviewed and accepted the suitability of the criteria used in the audit.

Period covered by the audit

The period covered by this audit begins with the comprehensive study carried out on the 1999 Project Millennium and ends with the 2007 Kearl Oil Sands Project joint review panel, including follow-up activities for those projects.

Audit work for this chapter was substantially completed on 30 April 2011.

Audit team

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Appendix List of recommendations

The following is a list of recommendations found in Chapter 2. The number in front of the recommendation indicates the paragraph number where it appears in the chapter. The numbers in parentheses indicate the paragraph numbers where the topic is discussed.

Recommendation Response

Information for assessing cumulative environmental effects

2.31 The Canadian Environmental Assessment Agency should assess lessons learned from previous cumulative environmental effects assessments of oil sands projects to identify good practices. These lessons learned should serve as a basis for adjusting terms of reference to proponents for future assessments of cumulative effects. (2.16–2.30)

Agreed. The Agency has already initiated improvements in the development of the terms of reference to proponents. This includes working with the provinces and other departments to ensure that the terms of reference to proponents take into account experience gained from previous environmental assessments. The Agency will continue to apply this approach for future projects as it strives to provide Canadians with world-class environmental assessments.

2.32 The Canadian Environmental Assessment Agency should review and update its guidance, including its 1999 Cumulative Effects Assessment Practitioners Guide, to take into account recent practices within Canada, including lessons learned from past assessments, as well as lessons from elsewhere regarding assessments of cumulative environmental effects. (2.16–2.30)

Agreed. The Agency will review its practitioner's guidance to ensure that it reflects best practices in cumulative effects assessment from Canada and around the world. The review will focus on recent knowledge, making use of both practitioners' experience and relevant findings from research studies. Developed for use by government and private sector practitioners, the Agency guidance will support the assessment of cumulative effects under the Canadian Environmental Assessment Act.

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Appendix



Office of the Auditor General of Canada



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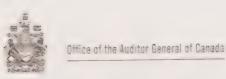


Report of the
Commissioner of the
Environment and
Sustainable Development

DECEMBER

The Commissioner's Perspective Main Points—Chapters 1 to 5 Appendix





The December 2011 Report of the Commissioner of the Environment and Sustainable Development comprises

The Commissioner's Perspective, Main Points—Chapters 1 to 5, an appendix, and six chapters. The main table of contents for the Report is found at the end of this publication.

The Report is available on our website at www.oag-bvg.gc.ca.

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To the Honourable Speakers of the House of Commons and the Senate:

On behalf of the Auditor General of Canada, I have the honour to transmit herewith this 2011 December Report to the House of Commons, which is to be laid before the House and the Senate, in accordance with subsection 23(5) of the *Auditor General Act*.

Scott Vaughan

Commissioner of the Environment and Sustainable Development

OTTAWA, 13 December 2011

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The Commissioner's Perspective



The Commissioner's Perspective



Scott Vaughan Commissioner of the Environment and Sustainable Development

Introduction

Science helps Canadians make decisions every day, and in the federal government, informed decision making is at the heart of sound policies. Our report this year covers two themes that relate to decision making: how environmental science and monitoring help support sound environmental decision making, and how the enforcement of federal environmental laws and regulations helps to foster good environmental stewardship.

This report includes an audit of environmental science at Environment Canada, as well as a study of federal environmental monitoring systems that shows how scientific analysis supports key decisions. We also include a study of the principles of sustainable fisheries that increases our understanding of how scientific information can help to improve the management of fisheries.

Federal environmental laws and regulations need to be enforced to foster good environmental stewardship. This report presents the audit results of how the federal government is managing the enforcement of some federal environmental laws and regulations according to the Canadian Environmental Protection Act, 1999, the Transportation of Dangerous Goods Act, 1992, and the National Energy Board Act. The last chapter of this report is the annual report on environmental petitions, which summarizes the petitions submitted in the past year, from 1 July 2010 to 30 June 2011, and the performance of federal ministries in responding to petitioners.

Finally, at the end of this Perspective, and as required by law, I comment on the information in Environment Canada's *Progress Report* for the government's *Federal Sustainable Development Strategy* 2010–2013, submitted in June 2011.

Environmental science and monitoring

Environmental science and Environment Canada

Chapter 2, Environmental Science, examines how Environment Canada is managing various science-based activities, from understanding and managing air and water pollution to determining which of the thousands of chemicals used every day are harmless and which are toxic.

Environment Canada defines itself as a "science-based" federal department: some 3,000 professionals work in various science and

technology programs, and over 65 percent of the Department's annual budget is spent on science and technology. Analysis by Environment Canada indicates that it is among the world's leaders in producing high-quality environmental research. The Department has a long record of accomplishments. These include taking action on the acid rain that damaged so many lakes and rivers in the 1980s, launching the UV Index in the 1990s to warn of risks from the depleted stratospheric ozone layer, and managing risks from mercury over the last several decades.

Our audit looked at how Environment Canada manages science, from ensuring the quality and strategic relevance of scientific research to communicating scientific evidence to decision makers.

We found that Environment Canada has the necessary systems in place to conduct high-quality science. How it ensures the quality of the scientific research it produces is based on principles of transparency that other world-class, science-based institutions apply so that research findings can be scrutinized and reproduced.

We examined the internal systems that Environment Canada has for informing programs and management of scientific evidence, and we found that good practices are in place. Overall, we found that federal scientists provide input into every major program area of Environment Canada; for example, reducing pollution, conserving nature, and assessing toxicity. Providing scientific evidence to meet the demands of programs and decision makers is a challenge. For example, the training of decision makers typically differs from that of scientists; the two groups use different workplace vocabularies, work on different schedules, and may have different assumptions about what constitutes fact-based decisions.

One important federal program noted in the audit is the federal government's Chemicals Management Plan. The process for assessing if substances are toxic includes risk assessments. The decision that a particular substance is toxic or not is made publicly available, and is subject to public commentary. The information and rationale are disclosed, allowing for informed opinion and debate, even if there is disagreement regarding a recommendation or a decision. Moreover, seeking public comment provides another benefit: information not considered previously can be submitted by an outside party. That additional information can strengthen the government's position or lead it to reconsider final recommendations.

Science and transparency

The federal government is required by law to increase its transparency in environmental matters. The specific purpose of the *Federal Sustainable Development Act*—adopted in 2008—is to increase the government's transparency and accountability to Parliament for environmental decision making. In my view, the Chemicals Management Plan is a model for the kind of transparency in decision making called for in the *Federal Sustainable Development Act*.

Transparency is an essential part of effective governance for democratic institutions, international financial markets, scientific research, and multilateral trading systems. Transparency is not a one-way street, whereby information is disclosed to the public after the fact. Instead, it involves a two-way exchange between government and its partners, based on meaningful public participation.

The communication of scientific research to external stakeholders is an important part of transparency. By objectively explaining what science findings mean, scientists can help Parliament and Canadians understand the significance of ongoing scientific research. I encourage the government to clarify when and under what conditions federal scientists are able to communicate the results of their research externally. Chapter 4, A Study of Managing Fisheries for Sustainability, notes that open and well-documented decisions can help in promoting acceptance and compliance between government and its stakeholders.

The federal government—including Environment Canada—conducts scientific research in support of the public interest. Across Canada, First Nations communities possess a wealth of information and traditional knowledge about Canada's changing environment. Universities, the private sector, and environmental organizations conduct important environmental research each day. However, few if any organizations, aside from the federal government, are capable of conducting credible, long-term environmental research and monitoring at a national level.

The current round of budget reductions facing the federal government underscores how critical it is for Environment Canada to have a strategy that specifies exactly which scientific research and environmental monitoring activities are indispensable and irreplaceable for Canada's public interest; which activities are duplicated, if any; and which can be performed by others.

In 2007, Environment Canada produced a long-term strategic science plan. It contained three long-term directions for its science activities aimed at ensuring that Canadians can continue to benefit from the Department's scientific skills and resources. However, our audit found that the plan had not been implemented across the Department. While individual programs have systems to set their own priorities, a department-wide strategic plan for science is more urgent than ever during this period of fiscal restraint.

Environmental studies

This report contains the results of two studies. Chapter 5, A Study of Environmental Monitoring, provides Parliament with an up-to-date inventory of the various federal monitoring systems in place and describes key attributes of an effective monitoring system. The second study, on sustainable fisheries, describes how scientific information can be used to confront the challenges to managing fisheries for sustainability.

Enforcing environmental laws

The second theme of this report is the enforcement of key federal laws and regulations intended to protect Canadians and the environment. We present the results of two audits: one on the transportation of dangerous products, and the other on the enforcement of the Canadian Environmental Protection Act, 1999 (CEPA 1999).

The government has established legislative and regulatory frameworks to protect human health and the environment. Transport Canada, the National Energy Board, and Environment Canada have programs intended to identify those who violate the law and have the authority to make violators take corrective action.

As discussed in Chapter 1, the *Transportation of Dangerous Goods* Act, 1992 regulates the everyday shipment of goods considered to be dangerous if mishandled. It covers transport systems and substances regulated by Transport Canada, such as industrial acids and petroleum products. The *National Energy Board Act* governs the shipment of petroleum products through the roughly 71,000 kilometres of oil and gas pipelines that are regulated by the National Energy Board.

Weaknesses in the management practices of Transport Canada's transportation of dangerous goods program are long-standing. An internal audit conducted in 2006 identified a number of weaknesses in management practices that have yet to be addressed. These include the need for a consistent approach to planning and carrying out Transport Canada's enforcement activities.

The National Energy Board has developed a sound risk-based approach for monitoring the adherence of regulated companies to established regulations and standards. Of concern is that the Board has yet to review many of the emergency response procedures manuals submitted by regulated companies.

In Chapter 3, Enforcing the Canadian Environmental Protection Act, 1999, we examined the enforcement of the Canadian Environmental Protection Act, 1999, and 45 of its 53 regulations that govern a wide variety of substances and activities in the Canadian economy—from hazardous wastes to contaminated fuels, asbestos, and the disposal of waste at sea. CEPA 1999 is enforced by Environment Canada.

We found that Environment Canada's enforcement program is not well managed to adequately enforce compliance with CEPA 1999. The Department's ability to adequately manage the enforcement program is limited by an incomplete knowledge of the regulated community. We noted that some of the regulations are not enforced at all due to a lack of training for enforcement officers or inadequate laboratory tests.

I am concerned that these three organizations have not been diligent in verifying that regulated companies have taken action to correct identified instances of non-compliance.

Assessing the fairness of information in the *Progress Report* for the Federal Sustainable Development Strategy 2010–2013

As required by section 23(3) of the Auditor General Act, I have assessed the information contained in Environment Canada's Progress Report for the Federal Sustainable Development Strategy 2010–2013.

My responsibility is to examine the progress report required under section 7(2) of the Federal Sustainable Development Act to assess the fairness of the information in the report with respect to the progress of the federal government in implementing the Federal Sustainable Development Strategy (FSDS) and meeting its targets.

My assessment covered only the information contained in Environment Canada's *Progress Report for the Federal Sustainable Development Strategy 2010–2013*. My assessment did not include information referenced by web links included in the report.

Environment Canada's first progress report on the implementation of the Federal Sustainable Development Strategy 2010–2013 describes the systems and strategies needed to implement the FSDS, and describes how results will be measured and shared in future reports. The report states that subsequent progress reports will track the implementation of the FSDS, and that a second and more substantive progress report will be tabled in the fall of 2012.

The FSDS report does not contain information on the progress of the federal government in meeting the targets set out in the Federal Sustainable Development Strategy that was developed in 2010. As a consequence, at this time, there is no basis for providing an assessment of fairness as required by section 23(3) of the Auditor General Act.

Conclusion

The year 2012 marks the fortieth anniversary of many national environmental ministries in the countries that are members of the Organisation for Economic Co-operation and Development (OECD). It also marks four decades since the first global meeting was held in Stockholm to examine the planet's changing environmental conditions. Achievements over this time have shown that environmental stewardship is complex and must be supported by informed decisions based on scientific knowledge and the results of effective environmental monitoring. Canadians look for policy choices that are based on the best available facts. I hope this report will help Parliament hold the government to account for the federal role in the environmental sciences.

Main Points—Chapters 1 to 5

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Transportation of Dangerous Products

Chapter 1

Main Points

What we examined

Dangerous products, as defined by federal legislation, play a key part in Canada's economy, whether exported directly, like gas and oil, or used by industry—for example, natural gas in the plastics industry and explosives in the mining and construction industries.

Shipments of dangerous products transported throughout Canada each year by road, rail, air, and ship number in the tens of millions and are subject to the *Transportation of Dangerous Goods Act, 1992* and its regulations administered by Transport Canada. The crude oil, petroleum products, natural gas liquids, and natural gas that move through approximately 71,000 kilometres of Canada's interprovincial and international oil and gas pipelines are subject to the *National Energy Board Act* and its regulations administered by the National Energy Board.

Both Transport Canada and the National Energy Board aim to promote the prevention of spills and releases of dangerous products and preparedness for incidents and emergencies that may arise. They do this by monitoring and enforcing compliance with legislation and standards and by taking actions to ensure that regulated organizations have appropriate and effective mechanisms in place to respond if an emergency does occur. In 2011–12, regulatory oversight activities accounted for about 63 staff and \$7.3 million at the National Energy Board and 74 staff and \$6.7 million at Transport Canada's Transportation of Dangerous Goods Directorate.

We examined how Transport Canada and the National Energy Board determine whether regulated organizations have complied with established legislation and standards in transporting dangerous products and whether they have prepared emergency response plans. We did not look at emergency response and recovery activities that would take place following an incident.

While this chapter contains references to various private sector companies, it must be noted that our conclusions about management practices and actions refer only to those of Transport Canada and the National Energy Board. We did not audit the records of the private

sector organizations. Consequently, our conclusions cannot and do not pertain to any practices that regulated organizations followed.

Audit work for this chapter was completed on 30 June 2011.

Why it's important

Dangerous products are a necessary element in the daily lives of Canadians. They range from gasoline used in motor vehicles to substances such as lead and mercury used in manufacturing electronics products. Industries that manufacture and use dangerous products provide jobs to Canadians.

While major spills and releases involving dangerous products are rare, they can have significant consequences for Canadians' health, the economy, and the natural environment. The shipment of dangerous products must be managed well to reduce the risk and impact of spills and releases.

What we found

- Transport Canada lacks a consistent approach to planning and implementing compliance activities. As a consequence, it cannot ensure that sites are inspected according to the highest risk.
- Transport Canada has not ensured that corrective action has been taken on instances of non-compliance. In the sample of completed inspection files we reviewed, 53 percent identified instances of non-compliance and, of those files, 73 percent contained incomplete or no evidence that corrective action had been taken.
- Transport Canada has given only temporary, interim approval for nearly half of the emergency response assistance plans put in place by regulated organizations. As a consequence, many of the most dangerous products regulated under the Act have been shipped for years without the Department having completed a detailed verification of plans for an immediate emergency response.
- Many of the issues our audit identified in Transport Canada are not new; an internal audit identified these same concerns over five years ago. The Department has yet to correct some of the key weaknesses in its regulatory oversight practices.
- While the National Energy Board has identified gaps and deficiencies through its verification of compliance for the companies it regulates, there is little indication that it has followed up to ensure that these deficiencies have been corrected. In our audit sample of completed compliance verification activities, 64 percent of the files identified gaps and deficiencies and, of those files, only 7 percent contained evidence that the Board had followed up to determine if corrective action had been taken.

• The National Energy Board has yet to review the emergency procedures manuals of 39 percent of regulated companies. As a consequence, it has not determined whether those manuals meet its established expectations. In our sample of manuals that it had reviewed, the Board identified deficiencies in all 30 cases but communicated those to only 3 of the regulated companies, and in only 1 case did it check to ensure that the noted deficiencies had been corrected.

The entities have responded. The entities agree with all of our recommendations. Their detailed responses follow the recommendations throughout the chapter.



Environmental Science

Chapter 2

Main Points

What we examined

Science plays a significant role at Environment Canada. Scientific expertise and the results of scientific research and monitoring are used to inform a wide range of decisions, from protecting Canada's freshwater resources to providing real-time weather and climate predictions; from protecting wildlife and habitat to controlling pollution; and from assessing and managing the risks of toxic substances to understanding Canada's changing climate.

In the 2010–11 fiscal year, the Department spent \$726 million of its total \$1.1 billion budget on science and technology; about 3,600 of its 7,000 employees were engaged in science and technology activities.

We examined how Environment Canada manages the quality of its science activities and communicates scientific evidence to decision makers. We also examined strategic and operational planning for science in support of departmental priorities and outcomes.

Audit work for this chapter was completed on 29 July 2011.

Why it's important

Science is part of the everyday life of Canadians. It contributes to having safe food and drinking water; it supports daily weather forecasts; it is used to prevent or control the entry of toxic substances into our environment and to protect natural ecosystems and biological diversity; and it contributes to the economic well-being of Canadians by supporting various industries such as farming, fisheries, forestry, and energy.

The importance of using scientific evidence to inform decision making is well recognized. Science is a key factor that informs decisions about legislation, regulations, policies, and programs that may contribute to sustainable development in Canada. Federal decision makers need access to timely, high-quality, and objective scientific advice to make decisions about policy challenges. Many of the issues that Canadians care about are also informed by science.

What we found

- Environment Canada released a Science Plan in 2007 that set long-term directions and priorities for managing and conducting its science activities. However, the Department recognizes that it has not implemented the Plan with sufficient rigour, and specific commitments in the Plan have yet to be carried out or documented. The Department does not have an operational plan with clear and measurable objectives necessary for putting the Plan into effect and measuring progress on the Plan's long-term directions.
- Environment Canada communicates scientific evidence in a variety of ways, from electronic newsletters that target broad audiences to briefing notes that are more tailored to the needs of internal decision makers. However, it has not systematically assessed how well it is communicating scientific evidence to decision makers. This makes it difficult for the Department to know whether communications are effective and whether they need to be improved.
- The Department has established systems and practices—ranging from peer review of its scientific publications to accreditation of its environmental testing laboratories—to ensure the quality of the science it conducts.

The Department has responded. The Department agrees with all of the recommendations. Its detailed responses follow the recommendations throughout the chapter.



Enforcing the Canadian Environmental Protection Act, 1999

Chapter 3

Main Points

What we examined

The Canadian Environmental Protection Act, 1999 (CEPA 1999) is Canada's principal federal environmental statute. It is intended to protect the environment and human health by mitigating and managing risks posed by harmful substances. CEPA 1999 and its regulations govern a variety of environmental matters, including toxic substances, cross-border air and water pollution, and waste disposal. The Act also imposes requirements for pollution prevention planning and emergency plans, and it regulates the interprovincial and international movement of hazardous wastes and recyclable materials.

Environment Canada's enforcement program is aimed at ensuring that individuals, companies, and government agencies comply with the pollution prevention and conservation goals of environmental and wildlife protection Acts and regulations, including CEPA 1999.

The enforcement of CEPA 1999 is carried out by the Department's Environmental Enforcement Directorate, comprising a national office and five regional offices across Canada whose activities include monitoring and enforcing regulatory compliance.

We examined whether Environment Canada's enforcement program was well managed to adequately enforce compliance with CEPA 1999. We assessed whether the Department has applied a risk-based approach to plan its enforcement activities and target the greatest threats to human health and the environment; enforced the law in a fair, predictable, and consistent way, as the Act requires; measured the results of its enforcement activities; and acted on identified opportunities for improvement.

Audit work for this chapter was completed on 11 October 2011.

Why it's important

CEPA 1999 states that the protection of the environment is essential to the well-being of Canadians and that the primary purpose of the Act is to contribute to sustainable development through pollution prevention. According to Environment Canada, environmental laws alone are not enough to guarantee a cleaner, better environment. These laws also need to be enforced. Enforcing CEPA 1999 is therefore an important part of protecting the health of Canadians, biodiversity, and the quality of Canada's air, soil, and water.

According to Environment Canada, enforcement of the law can encourage behavioural changes needed to protect the environment and human health by preventing and managing risks posed by toxic and other harmful substances.

What we found

- The enforcement program has not been well managed to adequately enforce compliance with the Canadian Environmental Protection Act, 1999 and ensure that threats to Canadians and their environment from pollution are minimized. The Environmental Enforcement Directorate lacks key information on regulated individuals, companies, and government agencies to know whether it is targeting its enforcement activities toward the highest-risk violators or the highest risks to human health and the environment, as called for by Environment Canada's own environmental enforcement policy.
- The Department's enforcement actions are limited by gaps in its
 capacity to enforce CEPA regulations. Many of the factors it considers
 in setting priorities for enforcement have nothing to do with risks to
 human health or the environment or with the past record of
 compliance of those regulated. Instead, some regulations are excluded
 from being priorities due to lack of adequate training for enforcement
 officers or lack of adequate laboratory testing to verify compliance.
- The Environmental Enforcement Directorate failed to follow up on half of its enforcement actions during the audit period to verify that violators returned to compliance with CEPA regulations.
 In addition, often it did not apply key management controls to ensure that enforcement officers applied the Act in a fair, predictable, and consistent manner across the country, as called for by the Act.
- The Department has been slow to act on significant shortcomings
 that continue to impede successful enforcement, such as inadequate
 gathering and analysis of information to inform enforcement planning
 and targeting, and inadequate training of enforcement officers.
 Furthermore, Environment Canada is not measuring the results of its
 enforcement activities and actions and does not know whether they
 have achieved the program objectives of encouraging compliance and
 minimizing damages and threats to the environment.

The Department has responded. Environment Canada agrees with our recommendations and has provided responses. However, it disagrees with our findings and conclusions. We elaborate on the disagreement at the end of the Conclusion section of this chapter.

Information contained in the Department's responses to our audit recommendations contradicts our audit evidence. The Department was not able to provide evidence to support the representations made in its responses.



A Study of Managing Fisheries for Sustainability

Chapter 4

Main Points

What we examined

The federal government is responsible for managing seacoast and inland fisheries on behalf of all Canadians and for ensuring that these activities are conducted in a sustainable manner.

Based on principles of sustainable development that are generally accepted internationally, a sustainable fishery would support the current needs of society and of individuals engaged in the fishery and would be managed with a view to protecting the resource for future generations.

We conducted this study to identify the challenges of operating fisheries in a sustainable way; the key properties of sustainable fisheries; and the principles, responsibilities, and management practices involved in managing fisheries sustainably. We focused on marine fisheries, which in Canada include First Nations, commercial, and recreational users.

This document is not an audit report. For this reason, our observations should not be seen as an assessment of the federal government's current fisheries practices or performance. This study is a step toward identifying a framework and criteria for our future audits to determine whether fisheries management practices are supporting sustainable fisheries.

Why it's important

Fisheries account for about 15 percent of the animal protein directly consumed by humans, and the demand for fish is expected to grow. In 2010, however, the Food and Agriculture Organization (FAO) of the United Nations reported that 32 percent of fish stocks worldwide were overexploited, depleted, or recovering.

In Canada, fisheries contribute to the national and coastal economies, but they are also under pressure. Some major fish stocks have declined substantially in recent years, with dramatic economic and social consequences. Because of the complexity of marine ecosystems, it can be challenging to manage human activities against a backdrop of natural variability.

Organizations that manage fisheries have a difficult job. They oversee and regulate the harvesting of fish in the context of significant uncertainty. They need to make decisions so that fish will be available in the future to provide the food and jobs on which many people rely.

What we found

- A sustainable fishery helps sustain fish stocks, markets, fishers, and, in some cases, communities. The long-term sustainability of a fishery depends, in part, on respecting ecological limits identified through the use of reliable scientific information. Respecting these limits requires taking into account the ecosystems on which fish survival depends and uncertainties about how the ecosystem will change.
- One element of a sustainable fishery is a framework of clear roles and responsibilities that is appropriate to the size and importance of the fishery. The FAO and others have concluded that fisheries are at greatest risk when such a clear framework does not exist. An effective framework of clear roles and responsibilities built on accountability and transparency can reduce the risk that fishing activity will endanger the long-term ecological sustainability of fish stocks.
- Every fishery includes many stakeholders. Within the necessary framework, management practices to help achieve a sustainable fishery include establishing and clearly communicating the social, economic, and ecological objectives for the fishery in order to guide the decisions and conduct of all those involved in it. Sound management practices also entail developing, implementing, and evaluating fishery plans aimed at sustainability, but they provide no guarantee of future harvests.



A Study of Environmental Monitoring

Chapter 5

Main Points

What we examined

The federal government collects information about what is going on in the environment to help Canadians make decisions every day. It monitors many different aspects of the environment, including solar flares, weather, air quality, migratory birds, fish, insects that carry human diseases, forests, water quality and quantity, changes in permafrost, and the ecology of national parks.

We conducted this study to develop an inventory of systems the federal government uses in monitoring the state of the environment; to identify the challenges associated with environmental monitoring; and to highlight good environmental monitoring practices. Together these serve as a basis for criteria for future audits of environmental monitoring conducted by the federal government.

We studied the environmental monitoring systems of several federal departments and agencies with responsibilities related to the environment. We interviewed expert officials from those organizations and from other jurisdictions, and reviewed the relevant literature. This included past observations and recommendations by our office; however, we did not follow up to determine what progress had been made.

This document is not an audit report. For this reason, our observations should not be seen as an assessment of the federal government's current practices or performance with respect to environmental monitoring. Because this is a study, it is descriptive and does not include recommendations.

Work for this chapter was completed on 31 July 2011.

Why it's important

Environmental monitoring is critical to knowing whether the quality of our environment is getting better or worse. Information gathered through environmental monitoring is important to many different decision makers, inside and outside the federal government. With the results of monitoring, the federal government can make informed decisions about how the environment will affect Canadians and how Canadians are affecting the environment. Outside the federal

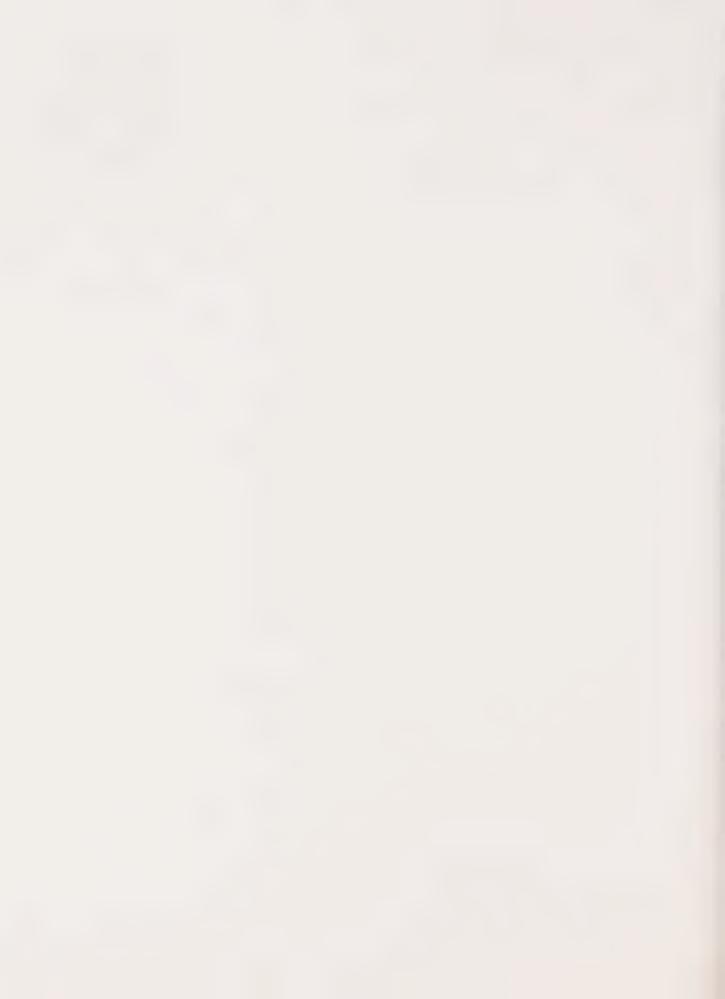
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government, the information is used by many people, such as municipal engineers to design flood control systems or public health experts to design effective policies. Timely and effective responses to environmental emergencies, such as spills, are impossible without adequate information. Farmers, hunters, foresters, and fishers all need to know what is happening to the natural resources they rely on.

The Canadian federal government shares responsibilities for environmental monitoring with businesses, local governments, provincial and territorial governments, and other national governments. Based on a Statistics Canada survey of federal science activities, we estimate that the federal government spends more than \$500 million each year on different environmental monitoring activities and assigns more than 2,500 people to these activities.

What we found

- Environmental monitoring generates the critical information that is essential for the federal government to provide sound stewardship of the environment. The government uses the information to assess the current state of the environment, to predict the future environment, and to develop sound strategies for adapting to environmental change. For example, daily weather forecasts rely on a complex set of linked environmental monitoring systems.
- Environmental monitoring systems are most successful when they are well coordinated with other systems, when the right partners participate, when quality is built in from the beginning, when reports are designed to be useful, and when resources are used efficiently. For example, some monitoring systems rely heavily on expensive tools and equipment, such as satellites or scientific research vessels, that need to be managed carefully with respect to their long-term benefits and costs.
- Well-managed environmental monitoring systems can provide a basis for Parliament to hold departments and agencies accountable for their environmental stewardship.



Appendix



Appendix Auditor General Act—Excerpts

An Act respecting the office of the Auditor General of Canada and sustainable development monitoring and reporting

INTERPRETATION

Definitions

2. In this Act.

"appropriate Minister"

"appropriate Minister" has the meaning assigned by section 2 of the Financial Administration Act:

"category I department"

"category I department" means

- (a) any department named in Schedule I to the Financial Administration Act;
- (b) any department in respect of which a direction has been made under subsection 11(3) of the Federal Sustainable Development Act; and
- (c) any agency set out in the schedule to the Federal Sustainable Development Act.

"Commissioner"

"Commissioner" means the Commissioner of the Environment and Sustainable Development appointed under subsection 15.1(1);

"sustainable development"

"sustainable development" means development that meets the needs of the present without compromising the ability of future generations to meet their own needs;

POWERS AND DUTIES

Examination

5. The Auditor General is the auditor of the accounts of Canada, including those relating to the Consolidated Revenue Fund and as such shall make such examinations and inquiries as he considers necessary to enable him to report as required by this Act.

Annual and additional reports to the House of Commons

- 7. (1) The Auditor General shall report annually to the House of Commons and may make, in addition to any special report made under subsection 8(1) or 19(2) and the Commissioner's report under subsection 23(2), not more than three additional reports in any year to the House of Commons
 - (a) on the work of his office; and,
 - (b) on whether, in carrying on the work of his office, he received all the information and explanations he required.

Idem

- (2) Each report of the Auditor General under subsection (1) shall call attention to anything that he considers to be of significance and of a nature that should be brought to the attention of the House of Commons, including any cases in which he has observed that
 - (a) accounts have not been faithfully and properly maintained or public money has not been fully accounted for or paid, where so required by law, into the Consolidated Revenue Fund;
 - (b) essential records have not been maintained or the rules and procedures applied have been insufficient to safeguard and control public property, to secure an effective check on the assessment, collection and proper allocation of the revenue and to ensure that expenditures have been made only as authorized;
 - (c) money has been expended other than for purposes for which it was appropriated by Parliament;
 - (d) money has been expended without due regard to economy or efficiency;
 - (e) satisfactory procedures have not been established to measure and report the effectiveness of programs, where such procedures could appropriately and reasonably be implemented; or
 - (f) money has been expended without due regard to the environmental effects of those expenditures in the context of sustainable development.

STAFF OF THE AUDITOR GENERAL

Appointment of Commissioner

15.1 (1) The Auditor General shall, in accordance with the *Public Service Employment* Act, appoint a senior officer to be called the Commissioner of the Environment and Sustainable Development who shall report directly to the Auditor General.

Commissioner's duties

(2) The Commissioner shall assist the Auditor General in performing the duties of the Auditor General set out in this Act that relate to the environment and sustainable development.

SUSTAINABLE DEVELOPMENT

Purpose

- 21.1 In addition to carrying out the functions referred to in subsection 23(3), the purpose of the Commissioner is to provide sustainable development monitoring and reporting on the progress of category I departments towards sustainable development, which is a continually evolving concept based on the integration of social, economic and environmental concerns, and which may be achieved by, among other things,
 - (a) the integration of the environment and the economy;
 - (b) protecting the health of Canadians;
 - (c) protecting ecosystems;
 - (d) meeting international obligations;

- (e) promoting equity;
- (f) an integrated approach to planning and making decisions that takes into account the environmental and natural resource costs of different economic options and the economic costs of different environmental and natural resource options;
- (g) preventing pollution; and
- (h) respect for nature and the needs of future generations.

Petitions received

22. (1) Where the Auditor General receives a petition in writing from a resident of Canada about an environmental matter in the context of sustainable development that is the responsibility of a category I department, the Auditor General shall make a record of the petition and forward the petition within fifteen days after the day on which it is received to the appropriate Minister for the department.

Acknowledgement to be sent

(2) Within fifteen days after the day on which the Minister receives the petition from the Auditor General, the Minister shall send to the person who made the petition an acknowledgement of receipt of the petition and shall send a copy of the acknowledgement to the Auditor General.

Minister to respond

- (3) The Minister shall consider the petition and send to the person who made it a reply that responds to it, and shall send a copy of the reply to the Auditor General, within
 - (a) one hundred and twenty days after the day on which the Minister receives the petition from the Auditor General; or
 - (b) any longer time, where the Minister personally, within those one hundred and twenty days, notifies the person who made the petition that it is not possible to reply within those one hundred and twenty days and sends a copy of that notification to the Auditor General.

Multiple petitioners

(4) Where the petition is from more than one person, it is sufficient for the Minister to send the acknowledgement and reply, and the notification, if any, to one or more of the petitioners rather than to all of them.

Duty to monitor

- 23. (1) The Commissioner shall make any examinations and inquiries that the Commissioner considers necessary in order to monitor
 - (a) the extent to which category I departments have contributed to meeting the targets set out in the Federal Sustainable Development Strategy and have met the objectives, and implemented the plans, set out in their own sustainable development strategies laid before the Houses of Parliament under section 11 of the Federal Sustainable Development Act; and
 - (b) the replies by Ministers required by subsection 22(3).

Commissioner's report

- (2) The Commissioner shall, on behalf of the Auditor General, report annually to Parliament concerning anything that the Commissioner considers should be brought to the attention of Parliament in relation to environmental and other aspects of sustainable development, including
 - (a) the extent to which category I departments have contributed to meeting the targets set out in the Federal Sustainable Development Strategy and have met the objectives, and implemented the plans, set out in their own sustainable development strategies laid before the Houses of Parliament under section 11 of the Federal Sustainable Development Act;
 - (b) the number of petitions recorded as required by subsection 22(1), the subject-matter of the petitions and their status; and
 - (c) the exercising of the authority of the Governor in Council under subsections 11(3) and (4) of the Federal Sustainable Development Act.

Duty to examine

(3) The Commissioner shall examine the report required under subsection 7(2) of the Federal Sustainable Development Act in order to assess the fairness of the information contained in the report with respect to the progress of the federal government in implementing the Federal Sustainable Development Strategy and meeting its targets.

Duty to report

(4) The results of any assessment conducted under subsection (3) shall be included in the report referred to in subsection (2) or in the annual report, or in any of the three additional reports, referred to in subsection 7(1).

Submission and tabling of report

(5) The report required by subsection (2) shall be submitted to the Speakers of the Senate and the House of Commons and the Speakers shall lay it before their respective Houses on any of the next 15 days on which that House is sitting after the Speaker receives the report.

Report of the Commissioner of the Environment and Sustainable Development—December 2011

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2011



Report of the
Commissioner of the
Environment and
Sustainable Development

DECEMBER

Chapter 1
Transportation of Dangerous Products



Office of the Auditor General of Canada



2011



Report of the
Commissioner of the
Environment and
Sustainable Development

DECEMBER

Chapter 1
Transportation of Dangerous Products





The December 2011 Report of the Commissioner of the Environment and Sustainable Development comprises

The Commissioner's Perspective, Main Points—Chapters 1 to 5, an appendix, and six chapters. The main table of contents
for the Report is found at the end of this publication.

The Report is available on our website at www.oag-bvg.gc.ca.

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Chapter
Transportation of Dangerous Products

Performance audit reports

This report presents the results of a performance audit conducted by the Office of the Auditor General of Canada under the authority of the Auditor General Act.

A performance audit is an independent, objective, and systematic assessment of how well government is managing its activities, responsibilities, and resources. Audit topics are selected based on their significance. While the Office may comment on policy implementation in a performance audit, it does not comment on the merits of a policy.

Performance audits are planned, performed, and reported in accordance with professional auditing standards and Office policies. They are conducted by qualified auditors who

- establish audit objectives and criteria for the assessment of performance;
- gather the evidence necessary to assess performance against the criteria;
- report both positive and negative findings;
- · conclude against the established audit objectives; and
- make recommendations for improvement when there are significant differences between criteria and assessed performance.

Performance audits contribute to a public service that is ethical and effective and a government that is accountable to Parliament and Canadians.

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Transportation of Dangerous Products

Main Points

What we examined

Dangerous products, as defined by federal legislation, play a key part in Canada's economy, whether exported directly, like gas and oil, or used by industry—for example, natural gas in the plastics industry and explosives in the mining and construction industries.

Shipments of dangerous products transported throughout Canada each year by road, rail, air, and ship number in the tens of millions and are subject to the *Transportation of Dangerous Goods Act, 1992* and its regulations administered by Transport Canada. The crude oil, petroleum products, natural gas liquids, and natural gas that move through approximately 71,000 kilometres of Canada's interprovincial and international oil and gas pipelines are subject to the *National Energy Board Act* and its regulations administered by the National Energy Board.

Both Transport Canada and the National Energy Board aim to promote the prevention of spills and releases of dangerous products and preparedness for incidents and emergencies that may arise. They do this by monitoring and enforcing compliance with legislation and standards and by taking actions to ensure that regulated organizations have appropriate and effective mechanisms in place to respond if an emergency does occur. In 2011–12, regulatory oversight activities accounted for about 63 staff and \$7.3 million at the National Energy Board and 74 staff and \$6.7 million at Transport Canada's Transportation of Dangerous Goods Directorate.

We examined how Transport Canada and the National Energy Board determine whether regulated organizations have complied with established legislation and standards in transporting dangerous products and whether they have prepared emergency response plans. We did not look at emergency response and recovery activities that would take place following an incident.

While this chapter contains references to various private sector companies, it must be noted that our conclusions about management practices and actions refer only to those of Transport Canada and the National Energy Board. We did not audit the records of the private

sector organizations. Consequently, our conclusions cannot and do not pertain to any practices that regulated organizations followed.

Audit work for this chapter was completed on 30 June 2011.

Why it's important

Dangerous products are a necessary element in the daily lives of Canadians. They range from gasoline used in motor vehicles to substances such as lead and mercury used in manufacturing electronics products. Industries that manufacture and use dangerous products provide jobs to Canadians.

While major spills and releases involving dangerous products are rare, they can have significant consequences for Canadians' health, the economy, and the natural environment. The shipment of dangerous products must be managed well to reduce the risk and impact of spills and releases.

What we found

- Transport Canada lacks a consistent approach to planning and implementing compliance activities. As a consequence, it cannot ensure that sites are inspected according to the highest risk.
- Transport Canada has not ensured that corrective action has been taken on instances of non-compliance. In the sample of completed inspection files we reviewed, 53 percent identified instances of non-compliance and, of those files, 73 percent contained incomplete or no evidence that corrective action had been taken.
- Transport Canada has given only temporary, interim approval for nearly half of the emergency response assistance plans put in place by regulated organizations. As a consequence, many of the most dangerous products regulated under the Act have been shipped for years without the Department having completed a detailed verification of plans for an immediate emergency response.
- Many of the issues our audit identified in Transport Canada are not new; an internal audit identified these same concerns over five years ago. The Department has yet to correct some of the key weaknesses in its regulatory oversight practices.
- While the National Energy Board has identified gaps and deficiencies through its verification of compliance for the companies it regulates, there is little indication that it has followed up to ensure that these deficiencies have been corrected. In our audit sample of completed compliance verification activities, 64 percent of the files identified gaps and deficiencies and, of those files, only 7 percent contained evidence that the Board had followed up to determine if corrective action had been taken.

• The National Energy Board has yet to review the emergency procedures manuals of 39 percent of regulated companies. As a consequence, it has not determined whether those manuals meet its established expectations. In our sample of manuals that it had reviewed, the Board identified deficiencies in all 30 cases but communicated those to only 3 of the regulated companies, and in only 1 case did it check to ensure that the noted deficiencies had been corrected.

The entities have responded. The entities agree with all of our recommendations. Their detailed responses follow the recommendations throughout the chapter.

Dangerous products—Chemicals such as sulphuric acid, gasoline, and oil, that when spilled or released have the potential to negatively impact the health of Canadians or the environment. The *Transportation of Dangerous Goods Act, 1992* refers to these products as "dangerous goods."



In February 2011, a gas pipeline exploded near Beardmore in Northern Ontario.

Photo: Kimberley Brunet



On 2 February 2001, a train derailment in Red Deer, Alberta, caused the release of nearly 72 tonnes of anhydrous ammonia (used in fertilizers and refrigeration, among other things). One person died and 34 people were hospitalized after exposure to the vapours. Anhydrous ammonia is toxic to fish and wildlife, and disperses easily in water.

Photo: Transportation Safety Board of Canada

Introduction

- 1.1 Dangerous products play a key part in Canada's economy. Products classified by the federal government as dangerous range from products like gas and oil that are consumed or exported to products used by industry, such as natural gas in the plastics industry, explosives in the mining and construction industries, and sulphuric acid and lithium in the manufacture of batteries. According to Transport Canada, there are tens of millions of dangerous product shipments each year. By tonnage, these products are transported by road (45 percent), rail (39 percent), ship (15 percent), and air (less than 1 percent). In 2008, the value of chemical product shipments was approximately \$47 billion. In 2009, the value of crude oil, petroleum products, and natural gas shipped by pipeline was approximately \$75 billion.
- 1.2 The safe use and transportation of dangerous products is important to Canadian society. Industries that manufacture, ship, and use dangerous products provide jobs to Canadians. Dangerous products are a necessary element in the daily lives of Canadians. Their use ranges from gasoline to power motor vehicles to substances such as lead and mercury used in the manufacture of electronic products.
- 1.3 If the movement of dangerous products is not handled correctly or accidents occur, it can result in injury or death. For example, acids coming into contact with skin can cause severe burns, and chlorine gas if inhaled can cause death. The transport of dangerous products can also adversely affect Canada's economy and the environment. For example, spills and releases of products such as acids and oils can result in the death of wildlife and the contamination of ecosystems.
- **1.4** Incidents can occur via any mode of transport. Recent incidents resulting in the release of dangerous products include
 - March 2007—A train derailment spilled sulphuric acid into the Blanche River just north of Englehart in Northern Ontario.
 - May 2011—A pipeline spill of 238,500 litres of crude oil occurred about 50 kilometres south of Wrigley in the Northwest Territories.
 - February 2011—A gas pipeline explosion near Beardmore in Northern Ontario led to the voluntary evacuation of homes.
 - March 2011—A train derailment near Port Hope in Southern
 Ontario resulted in the evacuation of homes and businesses and a
 fire involving a number of dangerous products, including propane,
 aviation fuel, and sulphuric acid.

Roles and responsibilities of organizations in the transport of dangerous products

- 1.5 A variety of organizations have key roles to play in ensuring the safe transportation of dangerous products or in responding to incidents if they occur. The organizations' responsibilities apply throughout the process of preventing and responding to spills or releases of dangerous products.
 - The federal government is responsible for regulating the domestic and international movement of dangerous products by road, rail, air, and ship. It is responsible for regulating the movement of dangerous products via pipeline across provincial and territorial borders and across international borders. It is also responsible, along with other organizations, for responding to spills or releases of dangerous products during their transport. The two federal organizations most involved are Transport Canada, which is responsible for overseeing compliance with legislation for the transport of dangerous goods via road, rail, air, and ship, and the National Energy Board, which regulates the transport of oil and gas and other petroleum products via international and interprovincial pipelines.
 - Companies and other organizations transporting dangerous products have an obligation to ensure they comply with legislation, regulations, and standards.
 - First responders such as fire and police are among the first ones on the scene of a spill or release and play a key role in minimizing the harmful effects.
 - Provincial and territorial governments play a role in ensuring that
 federal regulations for the transport of dangerous products are
 implemented. They have also established their own laws to
 regulate the transport of dangerous products by road within each
 province and territory, and by pipeline, where applicable.
- 1.6 There are four key steps that are followed in the prevention of and response to a spill or release of a dangerous product:
 - Prevention and mitigation measures aim either to prevent an incident from occurring or to mitigate the effects of a potential incident. Federal government measures include developing regulations and standards (such as emergency preparedness and response standards) and ensuring that organizations comply with them by, for example, conducting inspections and audits.
 - Preparedness involves regulated organizations preparing an emergency response plan to ensure that a suitable response capability exists to minimize the impacts on human health and the environment should an incident or emergency occur.

- Response to an incident or emergency when it occurs may involve regulated organizations and first responders activating and using the emergency response plan to address the incident.
- Recovery involves restoring the area affected to normal conditions.

Focus of the audit

- 1.7 Our audit focused on whether Transport Canada and the National Energy Board have designed and implemented a risk-based approach to determine whether regulated organizations transport dangerous products in accordance with established legislation and standards. We also looked to see whether Transport Canada and the National Energy Board had designed and implemented practices and procedures to monitor whether regulated organizations had prepared emergency response plans according to established legislation and standards.
- 1.8 Our audit focused on the prevention of spills and releases through inspections, audits, and other compliance verification activities conducted by the regulators. It also focused on Transport Canada's and the National Energy Board's review of emergency response plans submitted by regulated organizations to direct their responses in the event of a spill or release.
- 1.9 Our audit covered the period of January 2007 to June 2011. Sampled files were drawn from within this period to ensure sufficient coverage over multiple years. In certain cases, such as emergency response assistance plans and emergency procedures manuals, documentation outside of this time period was used to supplement the work undertaken.
- **1.10** More details about the audit objectives, scope, approach, and criteria are in **About the Audit** at the end of this chapter.

Observations and Recommendations

Transport Canada

- 1.11 Transport Canada is responsible for the regulatory oversight of domestic and international shipping of dangerous goods via road, rail, air, and marine transportation. The Department's mandate is set out in the *Transportation of Dangerous Goods Act*, 1992 and its regulations. These responsibilities include
 - developing and updating regulations;
 - monitoring compliance with and enforcing the Act and regulations;

- reviewing and approving emergency response assistance plans;
- developing means of containment standards (the container, packaging, or any part of the means of transport that can be used to contain a dangerous good);
- providing and developing inspector training (national, provincial, and territorial);
- providing a 24-hour-a-day bilingual emergency advisory information service (Exhibit 1.1); and
- attending and compiling data on accidents or incidents involving dangerous goods (Exhibit 1.2).

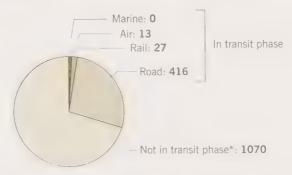
Exhibit 1.1 The Canadian Transport Emergency Centre

Transport Canada's Canadian Transport Emergency Centre (CANUTEC) provides expert information on a variety of subjects, including

- the chemical, physical, and toxicological properties of dangerous goods, as well as incompatibilities among dangerous goods;
- · health hazards and first aid;
- · hazards from fires, explosions, spills, or leaks;
- remedial actions for the protection of life, property, and the environment;
- · safe distances for evacuations; and
- personal protective clothing and decontamination.

In 2009, the Centre received 23,670 calls, of which 940 were in response to an emergency. The Centre sends reports to Transport Canada inspectors to help them improve their technical knowledge about emergencies.

Exhibit 1.2 Reportable accidents from 2007–10 involving dangerous goods by mode and phase of transport



^{*} Not in transit accidents are those that take place at facilities where the goods are prepared for transport (handled prior to loading or unloading), unloaded, or stored in the course of transport. In transit accidents include those that occur during transport.

Note: Accidents involving dangerous goods are "reportable" when the quantity of dangerous goods released exceeds the amount listed in the table contained in Part 8 of the *Transportation of Dangerous Goods Regulations*.

Source: Adapted from Transport Canada data.

Site—An actual building or premises where dangerous goods to transport are being manufactured, prepared for shipping, shipped from, detained (in transit), or received (destination). It represents a geographical location as opposed to a vehicle (train, truck, ship, or plane). An organization may have more than one site.

1.12 Within Transport Canada, the Transportation of Dangerous Goods (TDG) Directorate is responsible for administering the Transportation of Dangerous Goods Act, 1992. The TDG Directorate is responsible for promoting and enforcing compliance with the Act and regulations through a national awareness, inspection, investigation, and enforcement program and the coordination of activities by TDG inspectors. The Directorate assesses and approves emergency response assistance plans prepared by those importing, offering for transport, handling, or transporting dangerous goods in a quantity or concentration that is specified by regulations. The national program is delivered through headquarters in Ottawa and in five regional offices across Canada: Atlantic, Quebec, Ontario, Prairie and Northern, and Pacific. According to Transport Canada, it conducts more than 2,000 compliance inspections a year of sites involved in the transport of dangerous goods. According to the TDG Directorate, it has a staff of 74 and a budget of \$6.7 million.

- 1.13 Our audit examined whether the Department had
 - developed a risk-based approach to conduct its monitoring of regulated organizations,
 - carried out its monitoring program to determine if regulated organizations are in compliance with the Act and regulations,
 - developed performance measures that allow it to provide assurance to Canadians that regulated organizations are in compliance with the Act and regulations, and
 - reviewed and approved emergency response assistance plans.
- 1.14 Our recommendation to Transport Canada concerning compliance inspections and emergency response assistance plans appears at the end of this section, in paragraph 1.45.

There is no national risk-based compliance inspection plan

- 1.15 We examined the management processes and practices used by Transport Canada to establish its monitoring priorities for the year and to direct the work of its inspectors. This included policies, procedures, and manuals as well as the plans prepared by the Department's five regional offices.
- 1.16 According to the Treasury Board's Framework for the Management of Risk, a risk-based management process focuses efforts on those areas of significant risk. In monitoring compliance with the Act and regulations, a national, risk-based approach to inspection planning is necessary in order to determine the geographic areas,

transportation modes, or goods that pose the greatest risk, and to ensure that the regulations are applied fairly. Understanding overall risks in terms of their significance and the factors that influence those risks is a critical part of deploying scarce resources to the most significant areas, and establishing goals for the inspection program.

- 1.17 Some elements of a risk framework are in place. The Transportation of Dangerous Goods (TDG) Directorate has a compliance strategy to guide how inspections should be prioritized based on a ranking attributed to sites. According to this strategy, locations where the dangerous goods first enter the transportation system (such as manufacturers of large quantities of dangerous goods) should be categorized as top priority, and top-priority sites should be inspected regularly. However, this strategy is missing important elements needed to ensure that a coherent risk-based approach is used across Canada. For example, the strategy has not defined how frequently inspections must be done or indicated how to consider other types of risks, such as an organization's compliance history, in prioritizing inspections.
- 1.18 We found that Transport Canada does not have a national risk-based process for determining the sites that should be the highest priority for inspection. The regional offices are responsible for preparing compliance inspection plans. However, they use inconsistent processes, and the link between these processes and the sites selected for inspection is not clear. As a consequence, these plans lack details on what is being inspected or why it is being inspected.
- 1.19 For example, the Atlantic region's plans include a risk assessment matrix to identify and prioritize issues, such as training, within the regulated community and outline general tasks to address these issues; however, there is no indication of how many inspections will be carried out or which organizations will be inspected during the year. The Pacific region's plans contain a proposed number of inspections to be conducted by inspectors together with a list of organizations to be inspected; however, the plans do not contain supporting information on how these were selected. In the Prairie and Northern region, no documentation was provided to show that inspection plans have been prepared.
- 1.20 Information necessary for inspectors to effectively plan or conduct their work is missing or incomplete. Transport Canada does not have a complete picture of the organizations transporting dangerous goods. According to the TDG Directorate, there are about 25,875 active organization sites in its inspection database. However, the Directorate has not analyzed the quality of its inventory of organizations to support its assertion that the highest-risk organizations have been identified and

are being inspected. Further, the Directorate's own analysis finds that the database is not current: many of the organizations listed as "active" no longer carry dangerous goods or have closed. While the Directorate has other databases for the subset of organizations that require emergency response assistance plans (ERAPs) and for organizations that have reported incidents involving releases of dangerous goods, it has not evaluated whether these databases contain consistent information. For example, for one company that was closed in 2008, the inspection database shows that the company is inactive, but the ERAP database still shows that the company is active.

1.21 Without a national risk-based planning process and an accurate and reliable inventory of organizations posing the greatest risk in transporting dangerous goods, Transport Canada cannot ensure that sites are inspected according to the highest risk and that its resources are being allocated to areas of greatest concern.

There is a lack of follow-up by Transport Canada on identified deficiencies

- 1.22 We examined the activities that Transport Canada undertakes to monitor whether organizations shipping dangerous goods were in compliance with the *Transportation of Dangerous Goods Act, 1992* and regulations. We looked at the Department's compliance monitoring and enforcement activities for the period from 1 April 2008 to 1 April 2010. This included an examination of inspection files as well as the policies, procedures, and guidance established by the Department.
- 1.23 The Act and regulations set out the requirements that must be followed by organizations in the transport of dangerous goods and give Transport Canada the powers to conduct inspections and monitor compliance. Regulations prescribe key aspects such as labelling requirements, how substances are transported, and transport prohibitions.
- 1.24 Inspection and compliance monitoring is essential for the Department to know whether regulated organizations are complying with the Act and regulations and whether the interests of Canadians are adequately safeguarded. For example, an inspector can verify that the shipper of dangerous goods is using warning placards that indicate the type of substance being transported. These warning placards provide critical information for first responders at the scene of an accident—flammable goods like gasoline require a different response than corrosive goods like sulphuric acid. General compliance inspections can also include verifying that employees are trained to



Examples of types of placards used when dangerous goods are transported. Numbers in placards indicate class of dangerous goods, such as gases.

The placards above are presented for illustrative purposes only and are not exact representations. Regulations prescribe the particular design, colour, and text for each required placard.

- A Flammable gases such as propane
- B Toxic gases such as chlorine
- C Explosives such as dynamite
- D Radioactive materials such as uranium
- E Infectious substances such as viruses

Source: Adapted from Transport Canada



Dangerous goods can be transported by ship.

Photo: Rodolfo Arpia/Shutterstock.com



Dangerous goods can be transported by air.

Photo: vm/Shutterstock.com

handle dangerous goods, or that adequate means of containment are used for the goods transported.

- 1.25 We examined a random selection of 49 compliance inspection files carried out during the 2008–09 and 2009–10 fiscal years. We looked at the nature and extent of work carried out in conducting these inspections as well as other supporting files.
- 1.26 Supporting documentation is critical to demonstrate that inspectors have properly discharged their duties to verify organizations' compliance with regulations for the transport of dangerous goods. Transport Canada's Inspectors' Manual requires that good documentation be kept. We found that about 70 percent of the files we reviewed did not indicate the scope of the inspection, such as which regulatory requirements were assessed during the inspection. Without clearly laying out the inspection scope, anyone reviewing or following up on the inspection would have no way of knowing the requirements that had been evaluated.
- 1.27 We also found that of the files we reviewed, 53 percent noted instances of non-compliance with the Act and regulations. Examples of violations included missing information on shipping documents, missing training certificates for handling dangerous goods, missing and inadequate labelling, and problems with containers used to transport dangerous goods. In these files that identified instances of noncompliance, we noted that for the majority (73 percent) there was no, or incomplete, evidence that Transport Canada had determined whether the organizations had taken corrective actions. For example, we noted that the records for one company contained nine inspection reports over the last 11.5 years. All nine reports noted deficiencies; some of them repeated violations. Only three of the nine reports contained evidence that the organization had taken corrective actions. Violations included containers not meeting standards and a lack of proper warning placards, meaning there was an increased risk of a release of a dangerous good or risk that responders would not have the information needed to ensure the most appropriate response in case of an accident. A sound management practice should include follow-upwith the organization to ensure corrective actions have been taken.
- 1.28 One factor contributing to these deficiencies is a lack of guidance for inspectors. We examined the procedures and guidance materials provided to inspectors. Transport Canada does not have clear procedures and guidelines on how to document the scope of the inspection or what supporting evidence should be collected on items verified during an inspection. When violations are identified, there are



Dangerous goods can be transported by train.

Photo: Mayskyphoto/Shutterstock.com



Dangerous goods can be transported by truck
Photo: Samuel Acosta/Shutterstock.com

no clear procedures and guidelines on how to differentiate between major and minor violations and on how follow-up activities should be conducted to ensure that corrective actions have been taken. For example, in one of the files we examined, the inspector issued a \$630 fine to a company for missing warning placards. The company requested key pieces of evidence supporting the allegation, such as photos of the labelling infractions. However, the file contained little supporting evidence. The fine was later withdrawn.

1.29 Procedures and guidance materials are critical to ensure that inspectors have sufficient information to carry out their inspections and to ensure that inspections are carried out fairly and consistently across Canada. The procedures and guidance are also critical to ensure that sufficient evidence is collected and documented so government can prosecute organizations that do not comply.

Transport Canada does not know the extent to which organizations transporting dangerous goods are complying with regulations

- **1.30** We examined whether Transport Canada developed performance measures to determine rates of regulatory compliance in order to be able to report to senior management on departmental performance in administering the *Transportation of Dangerous Goods Act*, 1992 and its regulations.
- 1.31 The Department is making efforts to estimate the extent of compliance by conducting inspections based on a random selection of organizations' sites. Over a six-year period (2005 to 2010), these random inspections found that an average of 40 percent of the inspected sites were not compliant with the Act or regulations. However, Transport Canada has stated that it requires additional work to improve the method it uses to measure compliance. We noted that the Department has for seven years been developing an indicator to measure compliance.
- **1.32** Without a means of measuring performance, it is impossible to determine the extent to which organizations are following the rules for the safe transport of dangerous goods and whether compliance is improving or worsening from year to year.
- **1.33** We also noted that although the Transportation of Dangerous Goods (TDG) Directorate has overall responsibility for administering the *Transportation of Dangerous Goods Act*, 1992, responsibility for monitoring compliance under the Act and regulations is shared with the provinces and territories, other federal departments, and other directorates within Transport Canada. The TDG Directorate conducts compliance activities, including inspections at the sites of

organizations that manufacture, ship, import, handle, and offer dangerous goods for transport, including rail companies. Two other groups at Transport Canada, the Civil Aviation Directorate and the Marine Safety Directorate, conduct inspections for shipments made by air and marine transport, respectively.

The TDG Directorate does not collect or evaluate information on compliance monitoring and enforcement activities carried out by the civil aviation and marine safety directorates or by provinces and territories, and other federal departments. As well, the TDG Directorate has no comprehensive picture of the nature and extent of monitoring and enforcement being conducted for air, road, and marine transport. However, Transport Canada has indicated that these directorates, along with provinces and territories, present their findings through national stakeholder meetings twice a year. We further noted that the memoranda of agreement that govern the division of responsibilities within Transport Canada date back to 1983 and refer to federal organizations that no longer exist and do not specify performance reporting requirements.

Transport Canada does not conduct an adequate, timely review when approving emergency response assistance plans

- 1.35 Emergency response assistance plans (ERAPs) are required for the most dangerous goods regulated under the Transportation of Dangerous Goods Act, 1992 and its regulations. The purpose of such plans is to ensure that the equipment and expertise are available to immediately respond to an emergency.
- The Act requires Transport Canada to review and approve ERAPs. Under the Act, organizations that transport dangerous goods requiring an ERAP must prepare a plan and must have approval from Transport Canada before they can import, offer for transport, handle, or transport dangerous goods. When the organization applies to Transport Canada for approval, the Department reviews the application and provides either an interim or an indefinite approval, which allows the organization to transport a particular good over an identified period of time.
- 1.37 We assessed the practices used by Transport Canada to review and approve ERAPs. We looked at the Department's ERAP approval activities for the period from 1 April 2007 to 1 April 2011 along with some information dating back as far as 1994.
- According to the Act, interim approvals are to be a temporary measure until indefinite approval can be given. The reviewer is to

Chapter 1

check whether the information included in the application is reasonable and to verify that the telephone number for ERAP activation is correct. Interim approval can be given even if information is missing from the application, and provided that the reviewer has no reason to believe that information in the application is incorrect.

- 1.39 We found that of the 926 ERAPs in place, 473 have received indefinite approval from Transport Canada and 453 have received interim approval. Of the 453 ERAPs with interim approval, almost 50 percent of these approvals were provided over 5 years ago and about 15 percent of these were provided over 10 years ago. For example, one company transported shipments of at least 3,000 litres of flammable propane gas for over 13 years with only interim approval of its plan. The Department has not determined the risks associated with these delays, and therefore it cannot determine an appropriate risk-based review cycle or evaluate its resource needs.
- **1.40** Transport Canada's guidance for staff conducting ERAP assessments is insufficient to ensure that assessments are fair and consistent, a concern echoed by some of the staff conducting these reviews. Deficiencies included
 - inadequate guidance to determine whether an organization is required to prepare or activate an ERAP;
 - a lack of criteria to judge whether elements of ERAPs are acceptable—for example, what would be an effective communication strategy in the event of an emergency;
 - no definition of what constitutes a "major" and a "minor" deficiency, even though the remedy for a major deficiency is to halt shipments; and
 - little guidance on how ERAPs for organizations with cooperative response agreements should be assessed.
- 1.41 We reviewed a representative sample of 49 files—5 national and 44 regional—where ERAPs had received indefinite approval. Guidance calls for staff to collect and review inspection reports as a step in all regional ERAP reviews. Inspection reports had not been considered in any of them. There were numerous examples of shortcomings in review, approval, follow-up, and documentation. These examples included cases where Transport Canada was concerned about whether ERAPs were adequate, but it did not undertake timely follow-up. In some cases, no follow-up was done. In our opinion, Transport Canada is not able to demonstrate that it has exercised diligence in providing approvals.

Cooperative response agreements— Organizations transporting dangerous goods for which common response equipment and expertise would be needed to respond to an incident may enter into mutual aid or cooperative agreements to pool their resources (for example, maintaining response teams to cover part of a geographical area in which these goods are transported).

Management has not acted on long-standing concerns regarding inspection and emergency plan review practices

- 1.42 In September 2006, Transport Canada's internal audit group reported the results of an audit of inspection practices for the transport of dangerous goods. The audit made a number of observations and recommendations to strengthen management practices in the Transportation of Dangerous Goods (TDG) Directorate. Senior management accepted the audit's observations and recommendations and committed to make changes by April 2008.
- 1.43 Since then, based on information prepared by the TDG Directorate, the Department determined that it had implemented the management plan established in response to the recommendations and that further monitoring of progress against the recommendations was not necessary.
- **1.44** Despite this, we found that some of the key issues identified by Transport Canada in its 2006 internal audit remain unresolved.
 - Transport Canada has not evaluated the risk associated with an incomplete inventory of regulated organizations. It has stated that its existing databases include the higher-risk organizations that transport dangerous goods, but no evaluation was conducted to support this assertion.
 - The number of emergency response assistance plans with interim approval status (453) remains about the same as in 2006, but there has been an increase in the delay in reviewing these plans.
 - The TDG Directorate committed to develop a risk assessment framework to provide a rationale for site selection and inspection. The framework has yet to be developed.
 - The Transport Canada internal audit noted that there was an
 inconsistent approach to inspections and recommended new
 reporting procedures that should include elements such as
 documenting the scope of inspection and the manner of followup. There is still no clear guidance on documenting the scope or
 how to follow up on instances of non-compliance.
- 1.45 Recommendation. Transport Canada should establish and implement a clear action plan that sets out specific corrective steps to be taken to address our audit findings and the time frames within which the corrective actions will be taken. In particular, the action plan should ensure that
 - a national risk-based inspection planning process is developed and implemented,

- compliance monitoring and follow-up activities are properly documented,
- gaps in guidance for compliance monitoring and follow-up activities are addressed,
- roles and responsibilities for monitoring compliance with the Act and regulations are clarified,
- a performance measurement system that allows the Department to report on the rate of regulatory compliance is implemented,
- requirements for the review and approval of emergency response assistance plans are clarified,
- guidance to review emergency response assistance plans is developed, and
- a plan and timeline to complete emergency response assistance plan reviews is developed and implemented.

The action plan should indicate the staff responsible for each item and provide resources necessary to make the required change.

The Department's response. Agreed. Transport Canada will undertake the following actions to address audit findings:

- Complete a risk assessment by January 2012 that will serve as
 the basis for inspection schedules to be conducted by staff in each
 Transport Canada regional office. Managers and inspectors will be
 trained on the risk-based inspection schedule before its
 implementation in April 2012.
- Strengthen compliance monitoring guidance, tools, and processes and document follow-up procedures by June 2012; train managers and inspectors on both enhanced monitoring and follow-up procedures by October 2012; and, to support the review of Transport Canada inspection activities, introduce a quality assurance program by April 2013.
- Clarify and document roles and responsibilities of the various departmental modal groups involved in the inspection of dangerous goods, in updated memoranda of understanding by June 2012.
- Update and implement a performance measurement strategy for the Transportation of Dangerous Goods Program by December 2012. The strategy will inform ongoing data collection practices on the rate of regulatory compliance and will support performance reporting.

Review the Emergency Response Assistance Plan Program's
policies and procedures for approvals by 1 June 2012; develop
enhanced guidance material for staff by 31 December 2012; and
train staff and implement by 1 April 2013.

National Energy Board

- 1.46 The National Energy Board is an independent federal agency established in 1959 to promote safety and security, environmental protection, and economic efficiency in regulating those pipelines that cross provincial, territorial, or national boundaries. The Board's regulatory oversight applies to the entire life cycle of a pipeline (and related infrastructure) or facility project, including construction, operation, and abandonment. The Board is a quasi-judicial federal tribunal that operates as a court of record and reports to Parliament through the Minister of Natural Resources.
- 1.47 The Board regulates approximately 71,000 kilometres of pipelines. Oil and gas pipelines go through and near major communities throughout Canada. Major gas pipelines that have been recently approved include the Mackenzie Valley pipeline and the Deep Panuke pipeline, while the Vantage pipeline is a major gas pipeline that is proposed but not yet approved. Keystone XL is a major oil pipeline that was recently approved (in Canada only), while other major oil pipelines proposed, but not yet approved, include the Northern Gateway pipeline and the Bakken pipeline (Exhibit 1.3). As more pipelines are approved and begin to operate, the National Energy Board will have increased regulatory oversight responsibilities.
- 1.48 These pipelines, which are located in both rural and urban areas and across different terrains, require ongoing surveillance and maintenance to ensure that they continue to operate according to the *National Energy Board Act*, its regulations, and standards such as the Canadian Standards Association's Oil and Gas Pipeline Systems standard. Pipeline incidents, such as gas leaks and oil spills, have occurred across Canada (Exhibit 1.4). The ages of these pipelines range from newly built to some that were constructed in the 1950s (Exhibit 1.5).
- 1.49 The National Energy Board is responsible for administering the National Energy Board Act and its regulations, namely the Onshore Pipeline Regulations, 1999 and the National Energy Board Processing Plant Regulations. The Act and regulations identify obligations for regulated pipeline companies and the Act gives the Board enforcement and oversight responsibilities. According to the Board, it promotes safety and security, environmental protection, and economic efficiency

for the regulation of pipelines, energy development, and trade. The Board states that in carrying out this purpose, it takes proactive steps to clearly define its expectations, through regulations and other means,

Exhibit $1.3\,\,$ Operating, approved, and proposed gas and oil pipelines under the oversight of the National Energy Board





- Operating
- Approved The pipeline project was approved by the National Energy Board and the company is allowed to construct the pipeline.
- Applied The pipeline project was filed by the company and is currently in the assessment stage by (proposed) the National Energy Board: there is no decision yet whether the project can go ahead.

Source: Adapted from National Energy Board data

and to hold regulated companies accountable for actions that affect public safety and the environment. For the 2011–12 fiscal year, according to the Board, it has a budget of approximately \$7.3 million and a staff of 63 to conduct its compliance verification activities, such as inspections and audits.

- 1.50 Our audit examined whether the National Energy Board had appropriately
 - carried out its compliance verification activities in a manner that would allow it to determine if regulated companies adhered to legislation, standards, and Board expectations;
 - reviewed the emergency procedures manuals of the regulated companies; and
 - designed and implemented a risk-based approach as part of its monitoring of regulated companies.

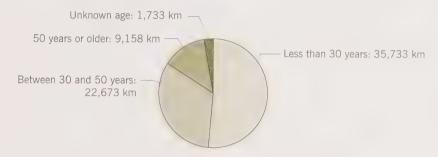
Exhibit 1.4 Location of incidents on pipelines regulated by the National Energy Board, January 2009 to March 2011



Source: Adapted from National Energy Board data

1.51 Our recommendation to the National Energy Board concerning compliance verification and emergency procedures manuals appears at the end of this section, in paragraph 1.78.

Exhibit 1.5 Age of pipelines regulated by the National Energy Board, as of July 2011



Note: This chart includes kilometres for only approved and operating pipelines. It does not include the kilometres for pipelines categorized as deactivated, deactivation in progress, or decommissioned. Source: Adapted from National Energy Board data.

There is a lack of follow-up by the Board on identified deficiencies

- 1.52 We examined the National Energy Board's compliance verification activities, such as inspections and audits, for the period between 2007 and 2010. We looked to see whether the Board had monitored the regulated companies in a manner that would allow it to determine if the companies were meeting the requirements to transport dangerous products by pipeline according to established legislation, standards, and Board expectations.
- **1.53** Under the *National Energy Board Act*, the Board has responsibilities to promote the safety and security of pipelines, including providing for the protection of the environment. The Board may also make regulations governing the design, construction, operation, and abandonment of a pipeline.
- 1.54 Compliance verification activities are critical for ensuring that regulated pipeline facilities are safe, secure, and built and operated in a manner that promotes the safety of Canadians and protects the environment. For example, regulations under the Act require regulated companies to have a pipeline integrity management program in place to provide for periodic assessment of the pipelines' structural integrity, to guide regular maintenance, and to help prevent a spill or release. Compliance verification of regulated companies includes activities such as inspections, audits of management systems and programs, compliance meetings, and evaluations of companies' emergency response exercises.

- verification activities that the Board conducted between 2007 and 2010 and examined whether the Board carried out its responsibilities according to established legislation and standards. (The results of our examination of this sample are found in Exhibit 1.6.) These activities were planned by the Board based on its risk-based approach that prioritizes compliance monitoring activities that it plans to conduct (see paragraph 1.73). We also examined whether the Board has adequate guidance for staff to ensure that regulated companies complied with the regulations and standards.
- 1.56 Cancellation of compliance verification activities. We noted that of the 56 planned high-risk compliance verification activities selected for review, 11 (20 percent) were later cancelled by the Board (Exhibit 1.6). A rationale was provided for the cancellation in 7 of the 11 cases. For 4 of the 11 cancelled activities, there was no evidence that they would be rescheduled or addressed through another compliance activity despite the fact that they were identified by the Board through its risk prioritization process as being high risk.
- 1.57 Information regarding nature and extent of reviews. Of the 45 planned compliance activities not cancelled, we found that files for 6 of these (13 percent) did not contain key documentation on the nature and result of compliance verification activities, and therefore we were unable to determine whether these activities were completed or whether there may have been any gaps or deficiencies identified (Exhibit 1.6).

Exhibit 1.6 The National Energy Board did not follow up on deficiencies it identified through the compliance verification activities

Number of compliance verification activities we examined*		
Activities that were cancelled		11
Activities that resulted in no gaps or deficiencies	i	10
Activities that were missing key documentation	İ	6
As a result, we were unable to determine whether these activities were completed or if there were any gaps or deficiencies.		
Activities that identified gaps or deficiencies		29
No evidence of follow-up to ensure that gaps or deficiencies were addressed in 27 of these 29 cases.		

^{*} Representative sample selected from a population of 253 activities conducted between 2007 and 2010 for the program areas and compliance activities that we examined.



Exposing a pipeline for an integrity inspection Photo: National Energy Board

Required follow-up on gaps and deficiencies. We noted that 29 of the 45 compliance activities (64 percent) identified multiple gaps and deficiencies with regulated companies' systems and processes designed to ensure safety, pipeline integrity, and protection of the environment (Exhibit 1.6). Of concern is that in 27 of these 29 cases (93 percent), we found no evidence that the Board followed up with the companies to determine whether the gaps and deficiencies had been addressed. As a consequence, we have concluded that the Board has not exercised a key element of regulatory monitoring: ensuring that identified weaknesses have been corrected by the regulated companies. Documenting the nature and extent of a completed compliance activity is essential to demonstrate that the Board is meeting its regulatory responsibilities. Inadequately documenting the results of compliance activities and the verification of actions taken also makes it extremely difficult for staff to follow up on those activities, which is especially critical whenever there is high employee turnover.

1.59 Guidance on conducting compliance verification activities. In addition to noting a weakness in follow-up procedures, we also noted weaknesses in guidance on how to conduct compliance activities. Overall, we found that guidance for Board staff conducting the compliance verification activities was unclear in a number of important areas. Specifically, we found that there was limited guidance concerning

- what follow-up procedures should be undertaken and documented when a gap or deficiency is identified through each type of compliance activity;
- how to ensure that corrective actions required of companies were in fact implemented, or whether they were implemented in a timely manner;
- how to determine whether an identified gap represents a major or minor deficiency; and
- when to have senior sign-off or review of the results of a compliance verification activity and who must conduct the signoff or review.

With limited guidance, and unclear direction for Board staff as to what their response should be when a gap or deficiency is identified, it is difficult to ensure that all regulated companies are treated consistently.

Oversight of emergency procedures manuals is deficient

- 1.60 Under the *National Energy Board Act* and its regulations, regulated companies are required to submit emergency procedures manuals and any subsequent updates to manuals for any pipelines they operate. In a 2002 letter to regulated companies, the Board set out its expectations for the contents for the manuals—at a minimum, the manuals should include information about 22 subjects, including environmental areas requiring special consideration or protection, description and location of emergency response equipment, and lists of persons in emergency planning zones.
- emergency plans, procedures, and practices. This allows the Board to determine the appropriateness and effectiveness of a company's emergency preparedness response program, which includes emergency procedures manuals. After assessing the manuals, if Board staff find gaps or deficiencies against Board expectations, they are required to inform the pipeline company of the gaps or deficiencies and can request corrections to the manuals. Staff are then to record any follow-up actions to be taken to correct the manuals and ensure they are updated accordingly.
- **1.62** A thorough and timely review of the manuals submitted is essential for ensuring that in the event of an incident or emergency, such as an explosion in a gas pipeline or a leak in an oil pipeline, there is an established and effective response plan that can be implemented immediately to help mitigate the effects.
- 1.63 As part of our audit, we examined the procedures established by the National Energy Board to review and assess the emergency procedures manuals of the regulated companies according to the legislation, standards, and guidelines. To do so, we looked at whether the Board had
 - received all required emergency procedures manuals and updates,
 - · reviewed all manuals received,
 - communicated any deficiencies identified in its review of the manuals to the regulated company, and
 - assessed whether identified deficiencies had been corrected in the manuals.
- 1.64 Proportion of emergency procedures manuals reviewed.

 According to Board records, the Board requires emergency procedures manuals for 83 regulated companies. We found that of the 83 regulated



Pipeline right-of-way during construction
Photo: National Energy Board

companies, the Board had conducted a review of manuals for only 51 of the companies (61 percent). The average time for review was almost three years after the manuals were submitted to the Board, with 16 manuals from 9 companies taking five or more years to be reviewed.

- 1.65 Emergency procedures manuals for the remaining 32 regulated companies (39 percent) had yet to be reviewed. The average length of time that these companies' manuals have gone without a review by the Board is over three and half years, with 18 manuals from 12 companies waiting to be reviewed for four or more years.
- 1.66 The review of emergency procedures manuals by the Board is typically conducted within one day by reviewing the manual contents against a checklist of required items. This is, however, a cursory review for the presence or absence of information, and it does not assess the validity or accuracy of the information contained in the manuals.
- 1.67 We selected a representative sample of 30 companies from the 51 companies whose manuals were reviewed by the Board. We examined the Board's manual reviews to determine whether they were conducted in a manner consistent with established Board guidance and whether the Board had advised regulated companies of any deficiencies. We also examined whether the Board followed up to ensure that regulated companies had corrected the deficiencies.
- **1.68** We noted that the Board identified deficiencies in all of the emergency procedures manuals that we reviewed. Deficiencies that were noted included
 - no identification of the hazards posed by the operation of the facilities,
 - no assessment of the risks posed by the hazards identified,
 - no list of residents in a potential accident zone,
 - no map of the nearby residences or evacuation routes,
 - no description or location of emergency response equipment,
 - no description of any environmentally sensitive areas potentially affected by an incident, and
 - no explanation of governmental roles in an emergency response.
- **1.69** Notwithstanding that all 30 manuals had deficiencies, only 3 of the 30 files (10 percent) contained evidence that the identified deficiencies had been communicated to the regulated companies. Only 1 of the 30 files contained evidence that the Board had checked to ensure that the deficiencies noted had been corrected.

- 1.70 Staff training and guidance to complete the reviews. As part of our audit we reviewed the formal training and guidance provided to Board staff who review emergency procedures manuals. Training and guidance is essential to ensure that staff understand what is expected of them and to ensure they understand the steps that must be taken to properly review emergency procedures manuals.
- 1.71 We found that training for those undertaking the manual reviews consisted of providing a checklist to be completed when reviewing the manual. We noted that the checklist contained few instructions and little supporting explanation or guidance for each of the elements that were to be reviewed.
- 1.72 During the course of the audit, the Board revised the review process and prepared a new review checklist that contains additional guidance for those completing the reviews. The Board has indicated that the revised process will include verification of certain critical information, such as confirming that a company's emergency contact number is correct and that all of a company's facilities are listed in its emergency procedures manual. However, the Board indicated that not all of the critical information will be verified when a company initially submits an emergency procedures manual, or an update to it. Companies selected for a more thorough examination, such as through an emergency management system audit, would be chosen through the Board's risk-based monitoring approach.

The Board has designed a sound risk-based monitoring approach, but improvements are needed in its implementation

- 1.73 We examined whether the Board has designed a risk-based approach as part of its monitoring system that will allow it to determine whether regulated companies are meeting the requirements to transport dangerous products according to established legislation and standards. We also examined implementation of the risk-based approach as part of the sampling of the Board's compliance monitoring activities and reviews of emergency procedures manuals.
- 1.74 We found that, overall, the Board has designed a sound risk-based approach to monitor regulated companies' adherence to established regulations, standards, and Board expectations. Every year, the Board evaluates regulated companies by level of risk in six program areas: security, safety, environment, pipeline integrity, damage prevention, and emergency management. Risk assessments from all areas and companies are evaluated, and then an overall risk-based plan is prepared for the compliance verification activities for the coming

year. The Board prioritizes resources available for compliance verification activities, and it focuses on companies requiring higher levels of regulatory compliance oversight (the top one third of prioritized companies).

- 1.75 However, some improvements are needed to better implement the risk-based approach. In particular, the accuracy and validity of the risk scores assigned to companies are currently affected by several factors:
 - The cursory review of companies' emergency procedures manuals does not provide an accurate assessment of a company's level of risk for this aspect of emergency preparedness (see paragraph 1.66). In addition, the Board has also not reviewed the emergency procedures manuals for 39 percent of regulated companies (see paragraph 1.65), which means that information to assess those companies' level of risk is missing.
 - Where reviews of emergency procedures manuals have been conducted, the Board largely failed to follow up to confirm that identified deficiencies were corrected (see paragraph 1.69), and therefore the Board is missing key information that could affect the evaluation of companies' risk.
 - The incomplete documentation of other compliance verification activities and the lack of follow-up to ensure that identified deficiencies have been addressed (see paragraphs 1.55–1.58 and Exhibit 1.6) mean the Board is missing some information upon which to base its assessment of company risk.
- 1.76 The Board has also conducted limited analyses to determine whether its risk-based approach is resulting in the right type, number, or frequency of compliance verification activities to ensure that the Board is meeting a minimum level of regulatory oversight. For example, the Board's 2002 letter providing guidance to regulated companies (see paragraph 1.60) notes that each company should, at least once every three years, conduct a full-scale emergency exercise involving all agencies with whom a company would interact in the event of an emergency, including the Board. With 83 regulated companies, that would mean an average of 27 full-scale emergency exercises conducted each year. From 2007 to 2011, Board records indicate that the Board evaluated a total of only 9 full-scale exercises. While a risk-based approach may not require the Board to evaluate all the full-scale emergency exercises each year, the Board's analysis of its risk-based approach is required in order to determine if the right type and number of compliance verification activities are being done to ensure that an adequate level of oversight is being carried out.

1.77 Lastly, the risk-based approach is also affected by limited guidance for staff in carrying out some compliance verification activities. For example, when a gap or deficiency is identified through an audit, there is limited guidance on how to determine if it is major or minor, therefore making it difficult to assign an accurate level of risk. There is also limited guidance to assist staff in identifying the timelines by which companies are required to fix gaps and deficiencies. This means that if deficiencies go unaddressed for many years, then a company's risk level could remain high. The Board has also not identified its tolerances for risks resulting from what is not included in its compliance verification plan or from planned compliance verification activities that are not completed. For example, if the Board carries out compliance verification for only the top 33 percent of prioritized risks, there is a chance that some companies' management systems that have significant risks may go without examination.

1.78 Recommendation. The National Energy Board should establish and implement a clear action plan that sets out specific corrective steps to be taken to address the audit findings and the time frames within which the corrective actions will be taken. In particular, the action plan should ensure that

- improved guidance to assist staff in carrying out their compliance verification activities (including the review of emergency procedures manuals) is developed and implemented;
- compliance verification activities are properly documented to demonstrate that due diligence has been exercised;
- follow-up of identified gaps and deficiencies, to verify that regulated companies have implemented corrective actions, is carried out and documented in a timely manner;
- all the emergency procedures manuals and updates for companies are checked to ensure that critical information is included and is satisfactory and that the results of that review are used to update companies' risk profiles; and
- the assessment of company risk is based on accurate and sufficient information.

The action plan should indicate the staff responsible for each item and provide resources necessary to make the required change.

The Board's response. Agreed. The National Energy Board will establish and implement a clear action plan to address the audit findings.

The Board supports continual improvement and in the 2010–11 fiscal year enhanced its compliance verification process to require justification and senior-level approvals before cancelling a compliance verification activity (CVA). Additionally, the process to evaluate emergency exercises and review emergency procedure manuals (EPMs) now requires follow-up and documentation to address gaps and deficiencies. The emergency exercise process also requires review and senior-level sign-off of all reports.

The Board is further enhancing its oversight of company EPMs, and by January 2012 will assess critical information in all EPMs. By March 2012, the Board will follow up and document where critical information is missing and address any gaps or deficiencies.

By April 2012, the Board will strengthen its compliance verification process to make sure that timely follow-up actions are undertaken to address gaps and deficiencies, and are appropriately documented. The Board will develop criteria to differentiate between major and minor deficiencies. Criteria for senior-level review and sign-off of CVAs will also be developed. Staff will be trained on all updated processes.

Finally, by April 2012, the Board will enhance its risk-based planning by creating a process to evaluate the effectiveness of its risk model.

Conclusion

Transport Canada

- 1.79 Transport Canada has not designed and implemented the management practices needed to effectively monitor regulatory compliance with the *Transportation of Dangerous Goods Act, 1992*. Key elements that are missing include a national risk-based regulatory inspection plan and necessary guidance for inspectors. In many instances, the nature and extent of the inspections carried out are not documented. We noted that there was little indication that the Department had followed up on identified instances of noncompliance to ensure that regulated organizations transporting dangerous goods had corrected the problems identified.
- 1.80 Transport Canada is not adequately reviewing and approving the emergency response assistance plans submitted by regulated organizations. Nearly half the plans submitted have been provided only an interim approval. Many of the organizations shipping dangerous goods have operated with an interim approval for over 5 years, and some for over 10 years.

1.81 Some of the issues contained in this report are not new. A 2006 departmental internal audit identified similar issues. Five years later, the Department has yet to address the identified weaknesses in its management practices.

National Energy Board

- 1.82 The National Energy Board has designed a sound risk-based monitoring system that it uses to determine whether regulated companies are meeting the requirements to transport oil, gas, and other dangerous products by pipeline. However, improvements to the implementation of the risk-based approach are required that would allow for a more accurate assessment and prioritization of the risks associated with regulated companies.
- 1.83 While the National Energy Board's compliance verification processes identify deficiencies in the practices used by regulated companies, in the files we examined there is little indication that the Board takes steps to ensure that the identified deficiencies are corrected.
- whether regulated companies have prepared emergency procedures manuals according to established legislation, standards, and Board expectations. The emergency procedures manuals have yet to be reviewed for about 39 percent of companies. For those that have been reviewed, we noted that in almost all instances identified, deficiencies were not communicated to the regulated companies, and in only one case did the Board check to ensure that the deficiencies had been corrected. We have concluded that the Board's oversight of companies' emergency procedures manuals is deficient.

About the Audit

All of the audit work in this chapter was conducted in accordance with the standards for assurance engagements set by The Canadian Institute of Chartered Accountants. While the Office adopts these standards as the minimum requirement for our audits, we also draw upon the standards and practices of other disciplines.

Objectives

The objective of the audit was to determine whether Transport Canada and the National Energy Board have designed and implemented risk-based monitoring systems to determine whether regulated organizations transport dangerous products in accordance with established legislation and standards and have designed and implemented practices and procedures to monitor whether regulated organizations have prepared emergency response plans in accordance with established legislation and standards.

In support of this objective, the two sub-objectives for the audit were to determine whether

- Transport Canada and the National Energy Board have designed and implemented a risk-based monitoring system to determine whether regulated entities are meeting the requirements to transport dangerous products according to established legislation and standards; and
- Transport Canada and the National Energy Board have implemented practices and procedures to
 monitor whether regulated entities have prepared emergency response plans according to established
 legislation and standards to respond to releases of dangerous products.

Scope and approach

For each audit sub-objective, the audit consisted of interviews with key departmental officials and the review of departmental policies and procedures related to the transport of dangerous products and the review or approval of emergency response plans. Interviews of departmental officials and our review of departmental policies and procedures provided us with an understanding of the practices implemented by Transport Canada and the National Energy Board to determine whether regulated organizations are meeting the requirements to transport dangerous products in accordance with established legislation and standards. A similar approach was used to identify the mechanisms used by the Department and the Board to determine whether regulated companies have prepared emergency response plans in accordance with established legislation and standards.

With regard to our audit work at Transport Canada, the audit examined a random selection of files pertaining to general compliance inspections (from a population of 3,551 sites inspected), rail inspections (from a population of 495), and approvals for emergency response plans to determine whether the monitoring system is adequate to allow Transport Canada to know whether dangerous products are transported according to established legislation and standards.

With regard to our audit work at the National Energy Board, the audit included an examination of a random selection of compliance verification activities carried out by the National Energy Board to allow it to determine whether regulated companies are in compliance with the established legislation and

standards. We selected our sample from a population of 253 compliance verification activities conducted between 2007 and 2010 and that were in three program areas; integrity management, safety management, and damage prevention management. The audit also included an examination of a random sample of emergency procedures manuals to determine whether the Board has ensured that the manuals submitted by regulated companies are in compliance with the legislation and standards. We did not audit the National Energy Board's pipeline application or approval processes.

Where representative sampling was used, sample sizes are sufficient to conclude on the sampled population with a confidence level of 90 percent and a margin of error of 10 percent.

Criteria

To determine whether Transport Canada has designed and implemented a risk-based monitoring system to determine whether regulated organizations are meeting the requirements to transport dangerous products according to established legislation and standards, we used the following criteria: Sources Criteria Transportation of Dangerous Goods Act, 1992 Transport Canada has designed a risk-based monitoring system that will allow it to determine whether regulated organizations · Framework for the Management of Risk, are in compliance with the legislation and standards. Treasury Board, 2010 Transportation of Dangerous Goods Act, 1992 Transport Canada carries out its monitoring in a manner consistent with the system as designed. · Framework for the Management of Risk, Treasury Board, 2010 • Transportation of Dangerous Goods Act, 1992 Transport Canada knows the extent of compliance and has implemented procedures to follow up on incidences of · Management Accountability Framework, Treasury Board non-compliance and to improve compliance. of Canada Secretariat, 2009 To determine whether Transport Canada has implemented practices and procedures to monitor whether regulated organizations have prepared emergency response plans according to established legislation and standards to respond to releases of dangerous products and approved emergency response plans that Transport Canada has determined are in compliance with the Act, we used the following criteria: Sources Criteria Transportation of Dangerous Goods Act, 1992 Transport Canada has defined the requirements that regulated organizations must adhere to in preparing emergency response · Framework for the Management of Risk, assistance plans (ERAPs) and has designed a risk-based Treasury Board, 2010 monitoring approach for prioritizing its review of ERAPs. CAN/CSA Z731-03 (Reaffirmed 2009) Emergency Preparedness and Response, Canadian Standards Association, 2003 • CAN/CSA Q850-97 (Reaffirmed 2009) Risk Management: Guideline for Decision Makers, Canadian Standards Association, 1997 Transport Canada assesses and approves the ERAPs prepared Transportation of Dangerous Goods Act, 1992 by organizations in accordance with Transport Canada review CAN/CSA Z731-03 (Reaffirmed 2009) Emergency Preparedness and Response, Canadian Standards Association, 2003 • CAN/CSA Q850-97 (Reaffirmed 2009) Risk Management: Guideline for Decision Makers, Canadian Standards Association, 1997

Transport Canada knows the extent of ERAP adequacy and has implemented procedures to follow up on gaps and deficiencies identified in the review of ERAPs.

- Transportation of Dangerous Goods Act, 1992
- Management Accountability Framework, Treasury Board of Canada Secretariat, 2009

To determine whether the National Energy Board has designed and implemented a risk-based monitoring system to determine whether regulated companies are meeting the requirements to transport dangerous products according to established legislation and standards, we used the following criteria:

Criteria	Sources	
The National Energy Board has designed a risk-based monitoring system that will allow it to determine whether regulated companies are in compliance with the legislation and standards.	Framework for the Management of Risk, Treasury Board, 2010	
	Management Accountability Framework, Treasury Board of Canada Secretariat, 2009	
	Integrated Risk Management and Corporate Risk Profile, National Energy Board, 2010	
	National Energy Board Act	
	Onshore Pipeline Regulations, 1999	
The National Energy Board carries out its monitoring in a manner consistent with the system as designed.	Enforcement Procedures, National Energy Board	
	Inspections Procedures, National Energy Board	
	Framework for the Management of Risk, Treasury Board, 2010	
	Management Accountability Framework, Treasury Board of Canada Secretariat, 2009	
The National Energy Board has implemented procedures to follow up on incidences of non-compliance and to improve compliance.	National Energy Board Act	
	Management Accountability Framework, Treasury Board of Canada Secretariat, 2009	
	Preparing and Using Results-based Management and Accountability Frameworks, Treasury Board of Canada Secretariat, 2005	

To determine whether the National Energy Board has implemented practices and procedures to monitor whether regulated companies have prepared emergency response plans according to established legislation and standards to respond to releases of dangerous products, we used the following criteria:

Criteria	Sources
The National Energy Board has defined the requirements that regulated companies must adhere to in preparing emergency procedures manuals and has designed a risk-based monitoring approach for its review of these manuals prepared by companies.	National Energy Board Act
	 National Energy Board letter to all Oil and Gas Companies/ Security and Emergency Preparedness and Response Programs, 2002
	CAN/CSA Z662-07 Oil and Gas Pipeline Systems, Canadian Standards Association, 2007
	CAN/CSA Z731-03 (Reaffirmed 2009) Emergency Preparedness and Response (referenced within CSA Z662-07), Canadian Standards Association, 2003

The National Energy Board has reviewed the emergency procedures manuals prepared by companies to ensure they have been prepared according to the Board's legislation and standards.

- National Energy Board Act
- CAN/CSA Z662-07 Oil and Gas Pipeline Systems, Canadian Standards Association, 2007
- CAN/CSA Z731-03 (Reaffirmed 2009) Emergency Preparedness and Response (referenced within CSA Z662-07), Canadian Standards Association, 2003
- National Energy Board letter to all Oil and Gas Companies/ Security and Emergency Preparedness and Response Programs, 2002

The National Energy Board has implemented procedures to follow up on gaps and deficiencies identified in the review of emergency procedures manuals.

Management Accountability Framework, Treasury Board of Canada Secretariat, 2009

Management reviewed and accepted the suitability of the criteria used in the audit.

Period covered by the audit

This audit covers the period from 1 January 2007 to 30 June 2011. Certain tests related to time periods in which emergency response assistance plans used information dating back to 1994. Audit work for this chapter was substantially completed on 30 June 2011.

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Appendix List of recommendations

The following is a list of recommendations found in Chapter 1. The number in front of the recommendation indicates the paragraph number where it appears in the chapter. The numbers in parentheses indicate the paragraph numbers where the topic is discussed.

Recommendation

Response

Transport Canada

- 1.45 Transport Canada should establish and implement a clear action plan that sets out specific corrective steps to be taken to address our audit findings and the time frames within which the corrective actions will be taken. In particular, the action plan should ensure that
- a national risk-based inspection planning process is developed and implemented,
- compliance monitoring and follow-up activities are properly documented,
- gaps in guidance for compliance monitoring and follow-up activities are addressed.
- roles and responsibilities for monitoring compliance with the Act and regulations are clarified,
- a performance measurement system that allows the Department to report on the rate of regulatory compliance is implemented,
- requirements for the review and approval of emergency response assistance plans are clarified,
- guidance to review emergency response assistance plans is developed, and

The Department's response. Agreed. Transport Canada will undertake the following actions to address audit findings:

- Complete a risk assessment by January 2012 that will serve as the basis for inspection schedules to be conducted by staff in each Transport Canada regional office. Managers and inspectors will be trained on the risk-based inspection schedule before its implementation in April 2012.
- Strengthen compliance monitoring guidance, tools, and processes and document follow-up procedures by June 2012; train managers and inspectors on both enhanced monitoring and follow-up procedures by October 2012; and, to support the review of Transport Canada inspection activities, introduce a quality assurance program by April 2013.
- Clarify and document roles and responsibilities of the various departmental modal groups involved in the inspection of dangerous goods in updated memoranda of understanding by June 2012.
- Update and implement a performance measurement strategy for the Transportation of Dangerous Goods Program by December 2012. The strategy will inform ongoing data collection practices on the rate of regulatory compliance and will support performance reporting.
- Review the Emergency Response Assistance Plan Program's
 policies and procedures for approvals by 1 June 2012; develop
 enhanced guidance material for staff by 31 December 2012;
 and train staff and implement by 1 April 2013.

Recommendation

 a plan and timeline to complete emergency response assistance plan reviews is developed and implemented.

The action plan should indicate the staff responsible for each item and provide resources necessary to make the required change.

(1.11–1.44)

Response

National Energy Board

1.78 The National Energy Board should establish and implement a clear action plan that sets out specific corrective steps to be taken to address the audit findings and the time frames within which the corrective actions will be taken. In particular, the action plan should ensure that

- improved guidance to assist staff in carrying out their compliance verification activities (including the review of emergency procedures manuals) is developed and implemented;
- compliance verification activities are properly documented to demonstrate that due diligence has been exercised;
- follow-up of identified gaps and deficiencies, to verify that regulated companies have implemented corrective actions, is carried out and documented in a timely manner;
- all the emergency procedures manuals and updates for companies are checked to ensure that critical information is included and is satisfactory and that the results of that review are used to update companies' risk profiles; and

The Board's response. Agreed. The National Energy Board will establish and implement a clear action plan to address the audit findings.

The Board supports continual improvement and in the 2010–11 fiscal year enhanced its compliance verification process to require justification and senior-level approvals before cancelling a compliance verification activity (CVA). Additionally, the process to evaluate emergency exercises and review emergency procedure manuals (EPMs) now requires follow-up and documentation to address gaps and deficiencies. The emergency exercise process also requires review and senior-level sign-off of all reports.

The Board is further enhancing its oversight of company EPMs, and by January 2012 will assess critical information in all EPMs. By March 2012, the Board will follow up and document where critical information is missing and address any gaps or deficiencies.

By April 2012, the Board will strengthen its compliance verification process to make sure that timely follow-up actions are undertaken to address gaps and deficiencies, and are appropriately documented. The Board will develop criteria to differentiate between major and minor deficiencies. Criteria for senior-level review and sign-off of CVAs will also be developed. Staff will be trained on all updated processes.

Finally, by April 2012, the Board will enhance its risk-based planning by creating a process to evaluate the effectiveness of its risk model.

Recommendation

Response

 the assessment of company risk is based on accurate and sufficient information.

The action plan should indicate the staff responsible for each item and provide resources necessary to make the required change.

(1.46-1.77)



Report of the Commissioner of the Environment and Sustainable Development—December 2011

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2011



Report of the Commissioner of the Environment and Sustainable Development

DECEMBER

Chapter 2
Environmental Science



Office of the Auditor General of Canada



2011



Report of the
Commissioner of the
Environment and
Sustainable Development

DECEMBER

Chapter 2
Environmental Science





The December 2011 Report of the Commissioner of the Environment and Sustainable Development comprises
The Commissioner's Perspective, Main Points—Chapters 1 to 5, an appendix, and six chapters. The main table of contents
for the Report is found at the end of this publication.

The Report is available on our website at www.oag-bvg.gc.ca.

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Chapter

2

Environmental Science

Performance audit reports

This report presents the results of a performance audit conducted by the Office of the Auditor General of Canada under the authority of the Auditor General Act.

A performance audit is an independent, objective, and systematic assessment of how well government is managing its activities, responsibilities, and resources. Audit topics are selected based on their significance. While the Office may comment on policy implementation in a performance audit, it does not comment on the merits of a policy.

Performance audits are planned, performed, and reported in accordance with professional auditing standards and Office policies. They are conducted by qualified auditors who

- establish audit objectives and criteria for the assessment of performance;
- gather the evidence necessary to assess performance against the criteria;
- report both positive and negative findings;
- · conclude against the established audit objectives; and
- make recommendations for improvement when there are significant differences between criteria and assessed performance.

Performance audits contribute to a public service that is ethical and effective and a government that is accountable to Parliament and Canadians.

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Environmental Science

Main Points

What we examined

Science plays a significant role at Environment Canada. Scientific expertise and the results of scientific research and monitoring are used to inform a wide range of decisions, from protecting Canada's freshwater resources to providing real-time weather and climate predictions; from protecting wildlife and habitat to controlling pollution; and from assessing and managing the risks of toxic substances to understanding Canada's changing climate.

In the 2010–11 fiscal year, the Department spent \$726 million of its total \$1.1 billion budget on science and technology; about 3,600 of its 7,000 employees were engaged in science and technology activities.

We examined how Environment Canada manages the quality of its science activities and communicates scientific evidence to decision makers. We also examined strategic and operational planning for science in support of departmental priorities and outcomes.

Audit work for this chapter was completed on 29 July 2011.

Why it's important

Science is part of the everyday life of Canadians. It contributes to having safe food and drinking water; it supports daily weather forecasts; it is used to prevent or control the entry of toxic substances into our environment and to protect natural ecosystems and biological diversity; and it contributes to the economic well-being of Canadians by supporting various industries such as farming, fisheries, forestry, and energy.

The importance of using scientific evidence to inform decision making is well recognized. Science is a key factor that informs decisions about legislation, regulations, policies, and programs that may contribute to sustainable development in Canada. Federal decision makers need access to timely, high-quality, and objective scientific advice to make decisions about policy challenges. Many of the issues that Canadians care about are also informed by science.

What we found

- Environment Canada released a Science Plan in 2007 that set long-term directions and priorities for managing and conducting its science activities. However, the Department recognizes that it has not implemented the Plan with sufficient rigour, and specific commitments in the Plan have yet to be carried out or documented. The Department does not have an operational plan with clear and measurable objectives necessary for putting the Plan into effect and measuring progress on the Plan's long-term directions.
- Environment Canada communicates scientific evidence in a variety of ways, from electronic newsletters that target broad audiences to briefing notes that are more tailored to the needs of internal decision makers. However, it has not systematically assessed how well it is communicating scientific evidence to decision makers. This makes it difficult for the Department to know whether communications are effective and whether they need to be improved.
- The Department has established systems and practices—ranging from peer review of its scientific publications to accreditation of its environmental testing laboratories—to ensure the quality of the science it conducts.

The Department has responded. The Department agrees with all of the recommendations. Its detailed responses follow the recommendations throughout the chapter.

Introduction

Environmental science and the federal government

- 2.1 Science is often described as both a body of knowledge and the process used to gain that knowledge. It is the systematic study of the natural and physical world through observation and experimentation. Scientific knowledge allows us to make discoveries, develop new technologies, solve practical problems, and make informed decisions. Science has influenced society for centuries.
- 2.2 Environmental science is a branch of science that examines the Earth's natural and physical environment and the complex interactions between humans and the environment. It takes a multidisciplinary approach to studying the environment; some of these disciplines include biology, chemistry, ecology, atmospheric science, and earth sciences.
- **2.3** Many of the issues that Canadians care about are informed by science, including the
 - safety of food and drinking water;
 - protection of natural ecosystems and biodiversity;
 - sustainability of Canada's communities (urban and rural) and of industries such as farming, forestry, and fisheries; and
 - dangers posed by new diseases.
- 2.4 Science gives us the knowledge we need to protect and improve our quality of life and the environment. It contributes to better health outcomes for Canadians and helps to ensure the responsible development of natural resources across Canada.
- 2.5 Federal decision makers need access to relevant, timely, and objective scientific information and advice to respond effectively to current and emerging policy challenges. Many federal departments—such as Environment Canada, Fisheries and Oceans Canada, Health Canada, and Agriculture and Agri-Food Canada—rely on their own internal science and assessments of externally generated science to inform decision making and policy development, and to effectively meet their regulatory responsibilities in such areas as health and safety, consumer products, and environmental protection.



Farmland in the Canadian prairies
Photo: Corel

- 2.6 The federal government has a unique and distinct purpose for conducting scientific research that differs from that of industry, academia, and not-for-profit organizations. In support of the Canadian public's interests, it carries out scientific research related to
 - policy making and regulation;
 - economic and social development;
 - the development and management of federal and international standards;
 - health, safety, and security; and
 - environmental protection.
- 2.7 Without good scientific evidence, the government lacks the information it needs to identify, assess, and manage environmental risks as well as to set priorities for policy, regulatory, and other interventions (such as standards and guidelines) to protect the environment.
- 2.8 Scientific evidence is a key factor that informs decisions. Other factors that may also inform decisions include government priorities, costs and benefits to human health and the environment, budgetary considerations, stakeholder and public input, and jurisdictional considerations. The decision-making process is complex and iterative, with scientific evidence and other factors being considered and debated.

Science and Environment Canada

- 2.9 Environment Canada describes itself as a science-based department. In the 2010–11 fiscal year it spent \$726 million on science and technology (over 65 percent of its total budget of about \$1.1 billion for that year)—\$264 million on research and development and \$462 million on related scientific activities. These expenditures increased by 10 percent between the 2007–08 and 2010–11 fiscal years.
- 2.10 In the 2010–11 fiscal year, about 3,600 of Environment Canada's 7,000 employees were engaged in science and technology activities, including research scientists, meteorologists, toxicologists, wildlife biologists, engineers, and technicians. They included professionals with post-graduate degrees in biology, chemistry, environmental sciences, hydrology (science that deals with the properties of water), and meteorology.
- Research and development—Creative work systematically undertaken to increase scientific and technical knowledge and to use this knowledge in new applications—for example, the Brewer ozone spectrophotometer, a scientific instrument that was developed by Environment Canada scientists and is now used worldwide for measuring the thickness of the ozone layer.
- Related scientific activities —Activities that add to research and development by contributing to the generation, dissemination, and application of scientific and technological knowledge—for example, the Canadian Aquatic Biomonitoring Network, a monitoring program managed by Environment Canada for assessing the health of freshwater ecosystems in Canada



A Brewer ozone spectrophotometer, on the roof of Environment Canada's ozone observatory in Toronto

Photo: Environment Canada

- **2.11** The Department operates 15 research institutes and laboratories, 6 weather research laboratories, and 32 water survey offices. Environment Canada also maintains air, climate, and water monitoring networks across Canada. More information on monitoring systems operated by Environment Canada can be found in Chapter 5 of this report, A Study of Environmental Monitoring.
- 2.12 Three Environment Canada branches deliver most of its science activities: the Science and Technology Branch, the Environmental Stewardship Branch, and the Meteorological Service of Canada. A significant proportion of the Department's scientific research is conducted by its Science and Technology Branch, which consists of five directorates (Atmospheric Science and Technology, Water Science and Technology, Wildlife and Landscape Science, Science and Risk Assessment, and Science and Technology Strategies).
- **2.13** The Science and Technology Branch provides a service that contributes to the following strategic outcomes of the Department:
 - conserving and restoring Canada's natural environment for present and future generations;
 - equipping Canadians to make informed decisions about changing weather, water, and climate conditions; and
 - minimizing threats from pollution to Canadians and their environment.
- **2.14** Environment Canada's Science Plan defines environmental science as

the use of investigative, analytical and experimental methods to measure, assess, interpret, predict and respond to changes in environmental parameters and processes, indicators of environmental health, and human interactions with the environment, using physical, chemical and biological principles.

- 2.15 Science plays a significant role in Environment Canada achieving its mandate. The Department states that science is a foundation of its work and the basis of its reputation with stakeholders and the international community. Its Minister, scientists, policy analysts, senior managers, and partners as well as others (such as provincial and territorial governments, industry, and non-governmental organizations) use science for a variety of reasons, such as
 - developing a range of instruments—such as regulations, pollution prevention plans, environmental standards, and environmental

Smog —A haze in the air consisting of gases and particles. It forms when natural and human sources release pollutants into the lower atmosphere. The largest sources of pollutants are the burning of fossil fuels for transportation, power generation, industry, and heating and cooling. The two primary pollutants in smog are ground-level ozone and particulate matter. Ground-level ozone is produced by a reaction between nitrogen oxides and volatile organic compounds in the atmosphere in the presence of sunlight. Particulate matter is a collection of airborne particles in solid or liquid form. Some examples are smoke and ash from burning wood Other components of smog include sulphur dioxide, volatile organic compounds, and carbon monoyide.



Smog in Ottawa, Ontario, in July 2011

- quality guidelines—aimed at managing risks from substances that are harmful to human health and the environment, such as mercury, lead, and **smog**;
- increasing understanding of the types and significance of stresses and pressures on ecosystems such as the Great Lakes, the Arctic, and the Lake Winnipeg Basin;
- better understanding and managing threats to sources of drinking water and aquatic ecosystem health in Canada;
- providing the basis for climate change adaptation and mitigation policy and actions;
- producing weather forecasts and warnings that are regularly provided to Canadians; and
- making advancements in managing risks from ozone depletion and acid rain.

2.16 Partnerships play an important role in the delivery of Environment Canada's science activities. Environment Canada assesses the reliability of scientific evidence generated by other organizations or conducted in partnership with other organizations, and integrates this knowledge into their decision-making processes. According to the Department, it conducts and publishes 90 percent of its research in collaboration with external researchers.

Focus of the audit

- 2.17 The objective of this audit was to determine if Environment Canada was adequately managing its scientific activities and communicating scientific evidence to decision makers. In this case, adequately managing scientific activities means that Environment Canada has
 - strategic priorities for those activities;
 - operational planning that, among other things, identifies expected results, accountabilities, resource requirements, and risks associated with delivering on these priorities;
 - scientific activities that incorporate standards of quality; and
 - systems and practices for communicating scientific evidence to decision makers and for assessing the effectiveness of those communications.
- 2.18 We examined how the Department ensures quality (that is, ensures that its science is reliable, credible, and objective). However, we did not examine the quality of the scientific evidence that is

provided to decision makers or the quality of data generated by the Department.

2.19 More details about the audit objectives, scope, approach, and criteria are in **About the Audit** at the end of this chapter.

Observations and Recommendations

Quality of scientific evidence

- 2.20 The quality of scientific evidence is critical for ensuring that the evidence used by decision makers and accessed by Canadians is reliable, credible, and objective. Poor evidence may lead to poorly informed decisions and bad outcomes, such as accelerated degradation of the environment and increased risks to human health. Ensuring quality also fosters confidence and trust and is central to the reputation of an organization and its scientists among peers.
- 2.21 Environment Canada's commitment to good-quality science is outlined in its 2007 Science Plan, which states that the Department must produce environmental science that is of the highest quality and that is leading edge, credible, and unbiased. This science will be used to support sound policies, effective regulations, and informed decision making. We examined the systems and practices that the Department used to meet this commitment.

Environment Canada has necessary systems and practices to ensure the quality of its science

- **2.22** We found that, given the diverse nature of its scientific activities, Environment Canada has different approaches to ensuring the quality of scientific evidence that is being produced, such as
 - peer review,
 - accreditation of its environmental research laboratories,
 - International Organization for Standardization (ISO) certification, and
 - working groups composed of internal and external experts and expert panels.

These systems and practices reflect those that are generally used in the scientific community.

2.23 Peer review. Environment Canada uses peer review to ensure and strengthen the quality and credibility of its scientific research. Subject matter experts conduct peer reviews of the methods and

Bibliometrics —A system for measuring both

findings of research that is destined for publication in scientific journals. Internally, experts also review reports that are used by decision makers, such as science assessment reports.

- 2.24 Environment Canada has a publishing policy that includes a standard of excellence, independence, and objectivity for producing good-quality scientific and technical publications, such as journal articles and books, conference proceedings, and technical newsletters. Guidance is also in place that includes an overview of the steps for producing online or printed publications and that helps the Department's scientists implement its publishing policy.
- 2.25 Environment Canada has used bibliometrics to measure the quality and quantity of the scientific publications it produces. It commissioned a bibliometric analysis for the period 2003 to 2007 that measured the number of citations of publications authored or coauthored by its staff. This analysis indicated that research published by departmental scientists is cited 40 percent more often than the world average and that they have published many highly cited articles on a wide range of topics, including climate, meteorology, atmospheric science, pollution, and environmental toxicology.
- **2.26** The following are examples of research results published in a peer-reviewed journal:
 - In 2007, Environment Canada scientists (in collaboration with researchers in the United Kingdom, the United States, and Japan) published an article in *Nature*, an international scientific journal, on how climate change caused by human activities is resulting in increases and decreases in precipitation on a global scale.
 - In 2011, subsequent research was published in *Nature* that confirmed the link between climate change caused by human activities and the observed intensification of extreme precipitation events over parts of the northern hemisphere land area. The research, conducted by some of the same Environment Canada scientists as well as collaborators from the University of Victoria and the United Kingdom, also showed that global climate models may have underestimated the observed trend, which implies that extreme precipitation events may gather force more quickly in the future than projected, and may have a more severe impact than previously estimated.
- 2.27 The bibliometric analysis indicated that, between 2003 and 2007, Environment Canada scientists produced about 600 peer-reviewed publications per year. The Department did not track the

number of peer-reviewed publications it produced in 2008, 2009, and 2010, and it does not keep a comprehensive list of these publications on its website. Tracking the number of publications and citations and understanding their trends is key to evaluating the impact and influence of research. Without current bibliometrics analysis, the Department cannot compare its performance against other Canadian or foreign scientific institutions and it cannot track or identify trends from the publications being produced.

2.28 We found that, in its departmental performance measurement framework, Environment Canada plans to measure performance according to the average number of peer-reviewed scientific publications and citations for its water- and weather-related science; however, the baseline value necessary for assessing performance has not yet been established. The Department informed us that it expects to use its Science Alert system to formally track peer-reviewed publications and plans to make some of its tracking output available on its website.

2.29 Accreditation of environmental research laboratories. Accreditation of Environment Canada's laboratories ensures that the research and analysis conducted by these laboratories adhere to accepted standards and procedures. The Department's nine environmental laboratories, which are involved in environmental testing, are accredited. These laboratories conduct work on a variety of topics, such as water quality monitoring, testing of wastewater treatment technologies, chemical assessments, wildlife disease, and vehicle emissions. The Canadian Association for Laboratory Accreditation Inc. carries out audits to verify and maintain accreditation of these laboratories.

2.30 International Organization for Standardization (ISO) certification. The Department also relies on ISO certification to manage the quality of research conducted by the Atmospheric Science and Technology Directorate, which produces research for the Meteorological Service of Canada (MSC). Two quality objectives have been established for this research, including the number of peer-reviewed scientific publications and the number of examples of science activities or results being transferred to the MSC's operational forecasting program.

2.31 Environment Canada has developed a quality management system that it applies to its science-based risk assessments of toxic substances, as part of the federal government's Chemicals Management Plan. The system outlines procedures and approvals

Science Alert—An electronic system used within Environment Canada to capture, summarize, and share newly published, peer-reviewed science that is written by its scientists. This system was put into place in 2010 and is available only fo departmental employees.



Water quality testing by an Environment Canada scientist

Photo: Environment Canada

required for releasing risk assessments for both public comment and final publication.

- 2.32 Working groups and expert panels. Environment Canada also uses working groups and expert panels to produce scientific evidence for decision makers. For example, since 2008, the Science Working Group, made up of experts from Environment Canada and other government departments, has advised the government's Chief Negotiator and Ambassador for Climate Change. The recently released environmental monitoring plans for the oil sands were produced by a large number of the Department's experts as well as external scientific experts.
- 2.33 We also note that Environment Canada is addressing the integrity of science. The fabrication and falsification of results and plagiarism can seriously tarnish the integrity and quality of the Department's science. To address this risk, the Department has developed a draft policy on the integrity of science. The policy also covers the use of science in decision making and requires that no employee, while performing his or her their duties on behalf of the Department, shall knowingly misrepresent scientific findings or advice. The policy outlines steps that complainants (both internal and external) can take if they feel the integrity of science has been compromised as well as steps for addressing allegations of scientific misconduct.

Communication

- 2.34 The importance of using scientific evidence to inform decision making, program management, and policy is well recognized by Environment Canada. For example, its Science Plan emphasizes this importance. The Treasury Board of Canada Secretariat's Policy on Information Management also notes that it is important that decision makers have access to high-quality information to support the delivery of programs and services.
- **2.35** Environment Canada and other organizations identify several good practices for communicating scientific results to decision makers, including
 - using a variety of methods to communicate scientific evidence;
 - providing summaries of scientific research results, using non-scientific language;
 - understanding the needs of users; and
 - evaluating whether communication efforts are effective, and how they can be improved.

2.36 We examined Environment Canada's systems and practices for communicating the results of science to decision makers, including its specific communications methods. We examined how the Department communicated scientific evidence to internal decision makers for selected issues that it was dealing with between 1 April 2007 and 31 March 2011. Finally, we examined whether the Department has systems in place for assessing how well scientific evidence is being communicated.

Environment Canada communicates science to decision makers, but needs to do more to assess the effectiveness of its communication

- 2.37 Environment Canada's Publishing Policy requires authors and co-authors of its scientific and technical publications to summarize the key findings of their work, including a brief description of the scientific and policy implications. The Department does so to ensure that its colleagues in scientific and policy communities benefit from its research findings. Authors may also be required to prepare briefing materials, if the pending publication is significant and relevant to the Department's key policies, priorities, or regulations.
- 2.38 Communicating science to broad audiences. Environment Canada communicates scientific evidence to broad audiences in a variety of ways, including electronic newsletters, science reports, and workshops. All of these are used to share science results and information with internal and external users: for example, those located in provincial and territorial governments, industry, and non-governmental organizations. Apart from tracking the number of users, the Department has done little analysis of how effectively these methods communicate scientific results and information.
- 2.39 We found that some of these communication methods are not being published as often as intended. For example, at the time of this audit, only one version of the Department's wildlife and landscape science newsletter, which it usually produces quarterly, had been released in 2011. Other methods (for example, science assessments and workshop reports) are also being released less frequently. For example, Environment Canada's most recent scientific assessment of priority freshwater issues in Canada, entitled "Pharmaceuticals and Personal Care Products in the Canadian Environment: Research and Policy Directions," was published in 2007. This report follows six reports on freshwater issues released between 2001 and 2006.



The Woodland Caribou Boreal population (Rangifer tarandus caribou) is classified as threatened under the Species at Risk Act.

Photo: Dr. Vince Crichton

- **2.40** Responding to the needs of specific users. Scientific evidence is used for many purposes within Environment Canada, such as
 - meeting legislative requirements, including assessing whether chemical substances are toxic under the *Canadian Environmental Protection Act*, 1999;
 - determining whether a species is at risk and identifying critical habitat for species at risk, as required by the Species at Risk Act;
 and
 - informing policy and program decisions, including the development of regulations and Canada's position in relation to international agreements.
- 2.41 We examined eight selected cases to determine how scientific evidence was being communicated within Environment Canada. These cases related to demands based on legislative requirements as well as policies and programs. They reflected some of the Department's focus areas, such as air emissions, water pollution, climate change, species at risk, and the risk assessment of chemicals. Users of the scientific evidence included the Minister of the Environment, the government's Chief Negotiator and Ambassador for Climate Change, and regulators. In examining documentation that contained scientific evidence, we considered the following:
 - Are the users' needs clear?
 - Do the communications include an interpretation of the scientific findings, including an analysis of the significance of results, uncertainty, and limitations of science?
 - Are recommendations provided based on an interpretation of the findings (if appropriate)?
- 2.42 In seven of the eight cases that we examined, the documentation provided by the Department addressed our questions; that is, the needs of users were documented, the scientific evidence was accompanied by an interpretation of the findings, and recommendations were made (where appropriate). We examined how scientific evidence was being provided to departmental decision makers. However, we did not examine whether or how science was considered by these decision makers.
- 2.43 We examined the process used to communicate scientific evidence to the government's Chief Negotiator and Ambassador for Climate Change, before international negotiations on climate change began in late 2009. In this case, a Science Working Group was

Black carbon—An airborne particulate matter that is emitted as a result of incomplete combustion. Important sources include fuel combustion used in transportation and heating. Black carbon is increasingly recognized as an important contributing agent to global warming.

Source Environment Canada

Siloxanes—A group of chemicals used in some consumer products, such as cosmetics, shampoos, and sunscreens.

Source Environment Canada

Bisphenol A (BPA)—A chemical used in some consumer products, such as plastic water bottles

Source- Environment Canada



Greenhouse gas emissions from automobiles in Ottawa, Ontario, in November 2011

Photo: Michelle Gorman

established and asked to give Canada's negotiating team policy-relevant scientific information to support its negotiations. We noted that the needs of the negotiator and his team were made clear. In particular, to direct its work, the Science Working Group was given research questions on topics such as long-term goals and targets, measuring greenhouse gases, climate models, black carbon, and emerging science on key issues related to the negotiations.

- 2.44 We also examined the Canadian Smog Science Assessment, by Environment Canada and Health Canada, which began in 2005 at the request of the Canadian Council of Ministers of the Environment (CCME). The assessment was initiated to inform national air quality management decisions and provide input to a planned 2010 review of the Canada-wide standards for particulate matter and ozone. It includes an evaluation of the state of scientific knowledge on smog, its formation, and its impact on the health of Canadians and their environment.
- 2.45 The assessment consists of a highlights document that summarizes its key findings, details of which are contained in a 1,300-plus page technical document. Environment Canada uses the summary report, and related briefing materials, to provide senior management with information and an interpretation of the scientific findings. These materials include an analysis of the significance of results and knowledge gaps. At the time of the audit, neither the highlights document nor the technical report had been publicly released.
- 2.46 We examined scientific evidence to support the original decisions regarding the toxicity of the chemicals siloxanes and bisphenol A (BPA). We found that the results of the assessments include an interpretation of the scientific evidence. These results also include uncertainty and limitations of the data as well as recommendations to list these substances as toxic under the Canadian Environmental Protection Act, 1999.
- 2.47 We examined how scientific evidence was communicated to the decision makers who are responsible for developing regulations to reduce greenhouse gas emissions from automobiles and light trucks. These regulations, which were implemented in 2010, are expected to result in a cumulative reduction of an estimated 92 megatonnes of carbon dioxide equivalent in greenhouse gas emissions over the lifetime operation of all 2011 to 2016 model year vehicles sold in Canada. The Department states that the regulations are aligned with similar standards that were adopted by the United States.

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- 2.48 We found that science played an indirect role in the development of the regulations, with economic modelling being used to generate the estimated emission reductions associated with the new regulations. However, science will play a role in their implementation. In particular, laboratory emissions testing of selected vehicles will help the Department assess compliance with the regulations and whether the regulations are reducing greenhouse gas emissions from automobiles and light trucks sold in Canada. The Department's scientific research also contributes to a better understanding of the toxic compounds being emitted from the transportation sector and the impact on the environment of renewable and alternative fuels in Canada.
- **2.49** In summary. Environment Canada uses a variety of methods to communicate scientific evidence to its decision makers. It is important for the Department to assess how well it is communicating scientific evidence, in order to
 - determine whether its various communications methods are useful,
 - determine whether scientific evidence is being delivered in a timely manner and in a way that is easy to understand, and
 - identify best practices and opportunities for improvement.
- 2.50 We found that Environment Canada has conducted some assessments of how well it is communicating scientific evidence to decision makers. In 2009, while measuring its research and development performance, it surveyed internal users of science to assess the timeliness of its science and how well it responds to user priorities. The survey results indicated that the majority of respondents (35 of 50) felt that the results of internal research and development were timely. However, the Department's assessment did not consider whether sufficient analysis and interpretation of scientific findings was being provided, or whether the various tools and approaches to communicating scientific evidence were effective.
- 2.51 The Department recently evaluated how well its research and development supports the needs of its meteorologists. The evaluation identified areas for improvement in how the science produced in the Department's national weather laboratories was being used to support decision making. It identified the need to strengthen communications between the science function and operations, so the perspective of external clients is adequately considered in science decisions. The evaluation included a recommendation for effectively transferring science knowledge to end users; management has begun implementing actions to respond to the recommendation.

- 2.52 Environment Canada recognizes that it is often difficult to communicate complex scientific evidence and advice to decision makers. As noted in its Science Plan, decision makers typically have different training from scientists; they use different vocabularies, work on different timelines, and can have different priorities. As previously mentioned, the Department has conducted some analysis on how well its science is being communicated to decision makers. According to the Department, it also relies on informal interactions, such as meetings and discussions between its scientists and decision makers, to know that science is being communicated in a way that meets the needs of users.
- 2.53 Given the significance of the decisions Environment Canada makes and the important role that science plays, combined with the challenges faced when communicating scientific evidence to decision makers, assessing communications to decision makers more systematically and regularly would be beneficial. This approach would let the Department know if communications between scientists and decision makers are effective and would allow the Department to identify best practices and areas for improvement.
- **2.54** Recommendation. Environment Canada should develop and implement an approach to assessing the effectiveness of its communication of scientific evidence.

The Department's response. Agreed. The Department recognizes the importance of reviewing and assessing the effectiveness of its communication of scientific evidence to internal decision makers. Effective communication facilitates the use of departmental science to inform the development of policy, programs, regulations, guidelines, and service delivery.

Further to assessments, evaluations, and other mechanisms that it has in place, the Department will undertake additional activities to assess selected mechanisms used for getting science to targeted internal decision makers by the end of the 2012–13 fiscal year. These assessments will serve as a means to understand if internal decision makers find the communication of scientific evidence to be accessible, timely, and understandable. The Department will use the results of these assessments to further refine and improve communications.

The Department will also continue to undertake activities to assess the utility and relevance of science for departmental clients, within the context of its ISO 9001 certified weather and environmental services, a significant portion of the Department's science efforts. This type of assessment is a requirement of the Department's formal Quality Management System.

Strategic and operational planning

2.55 Setting strategic direction and priorities for science activities within an organization helps to ensure that its officials receive the scientific advice and services they need to deliver on their mandated responsibilities. The absence of clear direction increases the risk that an organization's science activities will not align with or contribute to its mandate. The federal publications Mobilizing Science and Technology to Canada's Advantage (2007) and In the Service of Canadians: A Framework for Federal Science and Technology (2005) emphasize the importance of strategic direction and priorities.

2.56 To determine if strategic priorities had been set for Environment Canada's science activities, we examined its strategic planning documents and interviewed its officials. We also examined how progress on these priorities was being monitored.

Environment Canada has a Science Plan but has yet to integrate the Plan with its overall results management framework

- In 2007, Environment Canada released a Science Plan that set out a vision and contained commitments for undertaking, managing, and applying its science over the next 10 years. The Plan included the following three long-term directions for guiding the Department's work:
 - Develop an integrated environmental monitoring and prediction capability that will allow the Department to better understand the changing state of the environment.
 - Develop and implement strategies and tools to anticipate, understand, characterize, and communicate cumulative risks to, and the impact from multiple stressors on, human and ecosystem health and security and Canada's long-term competitiveness.
 - Help clients reduce risks and take advantage of opportunities arising from the changing environment, while building greater resilience in Canada's environment, communities, and key economic sectors.
- 2.58 These long-term strategic directions are relevant to the Department's mandate and priorities. For example, the development of the oil sands underscores the importance of both integrated environmental monitoring systems and the need to understand cumulative risks and effects. Making progress toward sustainable development, in the face of such factors as ongoing economic development, population growth, and changing landscapes and climate, also emphasizes the importance and relevance of understanding the pace of environmental change in Canada.

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Oil sands monitoring on the Athabasca River Photo: Greg Bicherton

- 2.59 The Science Plan includes high-level commitments aimed at effectively managing science in several key areas, including human resources, collaborations, and infrastructure (for example, buildings and equipment). It also includes commitments to communicating science and developing related practices based on how, where, and why science information is used in the policy development process.
- 2.60 Environment Canada's program activity architecture and related results management framework outline the environmental priorities and programs of the Department. The Science Plan indicates that its long-term directions were to be integrated with the Department's overall results management framework to ensure that the Plan contributes to planning and operational decisions; however, the Department has concluded that this has seen only limited progress. Without integrating the Science Plan with the framework, the Department has not taken the actions necessary to put the Science Plan into effect and to move it from theory into practice.
- **2.61 Recommendation.** Environment Canada should integrate its Science Plan with its results management framework.

The Department's response. Agreed. The Department will review the strategic directions in the Science Plan by the end of the 2012–13 fiscal year. This will inform decision making on whether the strategic directions for science need to be updated to reflect new priorities. Following the review, the Department commits to aligning its long-term priorities for science with the departmental results management framework (Program Activity Architecture).

The Department recognizes the importance of aligning science activities to departmental priorities. It is currently doing this through its annual corporate planning and budget allocation process—which includes the development and implementation of operational plans—and existing reporting processes.

Implementation of Environment Canada's Science Plan is not supported by operational planning

2.62 Operational planning provides a common understanding of what needs to occur to implement priorities and long-term directions and what science needs to address. Operational plans act as a road map, explaining how an organization will get from where it is today to where it wants to be in the future. Measuring, monitoring, and reporting on results and achievement against targets are important for understanding what progress is being made on priorities, identifying areas for improvement, and informing future planning.

- 2.63 The process from setting plans to monitoring results is critical given the multiple priorities and increasing demands facing the Department, the demographics of its scientific workforce (Exhibit 2.1), and the risks it faces in recruiting, developing, and retaining the skills necessary to deliver on its mandate. Planning to ensure efficient and effective delivery of the long-term directions outlined in the Science Plan is even more important given current fiscal restraints and recently announced budget reductions affecting the Department.
- 2.64 To determine if Environment Canada has adequate operational planning in place to support its Science Plan, we examined relevant documents and interviewed officials at Environment Canada. We also examined the Department's planning systems and operational plans, including those of the Science and Technology Branch, as well as its process for monitoring progress against those plans.
- 2.65 Environment Canada's Science Plan sets a vision, long-term directions, and high-level commitments for its science activities. We found that the Department lacks an operational plan that contains the necessary objectives, targets, and actions to achieve the strategic directions and commitments in its Science Plan. We also found that the Science Plan's long-term directions and commitments have not been adequately integrated into the Department's existing operational plans.
- **2.66** The Department informed us that, over the last five years, its governance and planning processes have been in a state of constant change. The Department's operational planning has changed in response to changes in its senior management and governance regime.

Exhibit 2.1 Almost half of the employees in the scientific research category will be eligible for retirement by the 2015–16 fiscal year, according to Environment Canada

Selected categories of employees	Total number of employees	Employees eligible for retirement	Percentage of employees eligible for retirement
Scientific Research	205	95	46°.
Engineering and Scientific Support	924	252	21°c
Meteorology	573	134	23°-
Engineering	359	73	20°5
Physical Sciences	1.112	156	14°c

- 2.67 Environment Canada produced an annual progress report on its Science Plan, for the 2009–10 fiscal year, which is essentially a listing of projects and activities. Without clear and measurable objectives and a plan that explains how progress on the long-term directions will be made, the Department does not have the basic tools necessary to implement its Science Plan or to measure progress against the Plan's long-term directions and to meet the commitments set out in the Plan.
- 2.68 Environment Canada recognizes that the Science Plan has not been put into practice with sufficient rigour and that specific commitments remain undocumented or unexecuted. The Department expects to review its Science Plan in 2012. In our opinion, this review needs to identify how to effectively implement and monitor the achievement of the strategic priorities set out in the Science Plan and how to integrate the plan into the Department's overall planning process.
- **2.69** Recommendation. Environment Canada should develop clear and measurable objectives and targets for measuring progress against the long-term directions and meeting the commitments that are set out in its Science Plan and integrate the Plan into its overall planning process.

The Department's response. Agreed. The Department recognizes that its strategic plans for science should set clear, achievable objectives and that implementation should be achieved through the departmental performance and results management framework (Program Activity Architecture).

The Department's Science Plan sets out a vision that highlighted important challenges for science and the management of science. The Department has made progress reaching the objectives set in the Science Plan, including improvements in getting science to decision makers.

As stated in its response to recommendation 2.61, the Department commits to reviewing the strategic directions in the Science Plan by the end of the 2012–13 fiscal year. The Department commits to developing clear and measurable objectives and targets in order to measure progress on its implementation of the Science Plan by the end of the 2013–14 fiscal year.

Environment Canada would benefit from an external review when it assesses the relevance of its research

- 2.70 While it is important to ensure that the evidence that results from scientific research is of high quality, it is equally important to ensure that the research is relevant to an organization's mandate and reflects its priorities. Assessing the relevance of scientific research can be done by implementing a regular and systematic peer review process, which will also help ensure that scientific research projects are being assessed consistently and objectively.
- 2.71 At a departmental level, Environment Canada relied on its results management boards to review and approve research programs to ensure their relevance to departmental priorities. We found that the boards were not effectively performing this role; two of the three boards have not met since early 2010, and all three became inactive at the end of the 2010–11 fiscal year.
- 2.72 We found that the directorates in the Science and Technology Branch use a variety of practices to review and select scientific research projects. These practices are quite varied, are tailored to each directorate, and can include internal planning processes, consultations with program clients, and vetting of research proposals through ad hoc review committees or committees related to internal or external funding programs.
- 2.73 One practice that has not been recently used is independent external peer review. Although it would add to an already heavily governed system, the benefits of external peer review could outweigh the costs if done periodically (for example, every five years). For example, the Meteorological Service of Canada (MSC) underwent an independent peer review (completed in 2002), which assessed the quality and relevance of its research. The review concluded that the MSC's research and development program was fundamentally sound and that it was responsive to the needs of Environment Canada and Canadian citizens. By providing the Minister and the Deputy Minister with an external and objective perspective on the quality and relevance of the Department's research, periodic external reviews would also add value to the internal reviews currently employed within the Science and Technology Branch.
- **2.74** Recommendation. Building on past and current practices, Environment Canada's Science and Technology Branch should establish a periodic external review process for assessing the relevance and quality of the Department's science.

The Department's response. Agreed. In its 2009 document, Measuring Environment Canada's Research & Development (R&D) Performance, the Department reported that the research and development performed by the Department is excellent, world-class science and is aligned with and relevant to users' needs. To build on current practices, the Science and Technology Branch will initiate, by the end of the 2012–13 fiscal year, an externally performed bibliometric study on research and development excellence. In addition, by the end of the 2014–15 fiscal year, the Science and Technology Branch will conduct a follow-up to the 2009 study on measuring research and development performance. These assessments will provide valuable analysis to identify trends, gaps, and/or opportunities regarding the relevance and excellence of science that will further inform planning of external reviews.

The Department assesses the alignment and relevance of all its activities through departmental planning processes for program activities (in the Program Activity Architecture), which integrate science. A significant part of the Department's science is conducted in support of its weather and environmental services, which, as noted in previous responses, conduct regular assessments of the relevance and excellence of the science required for these services, as part of its Quality Management System (ISO 9001).

Conclusion

- 2.75 Science plays a significant role in achieving Environment Canada's mandate. We examined how Environment Canada manages the quality of its science activities and how it communicates scientific evidence to decision makers. We also examined whether the Department had identified strategic priorities for its science activities and whether operational planning identified expected results, accountabilities, resource requirements, and risks to delivering on these priorities.
- **2.76** We found that Environment Canada has incorporated standards of quality and that it uses a range of systems and practices—including peer reviews of scientific publications and accreditation of environmental testing laboratories—to ensure the quality of the science it conducts.
- 2.77 Environment Canada uses a variety of methods to communicate scientific evidence to decision makers. The Department has conducted some analysis on how well its science is being communicated to decision makers. In our opinion, assessing communications to decision

makers more systematically and regularly would give the Department a better idea of how well it is communicating scientific evidence to decision makers.

- 2.78 In 2007, Environment Canada developed a Science Plan that sets out long-term directions for science and commitments for undertaking, managing, and applying its science over the next 10 years. However, the Department has yet to implement the Plan or integrate it into its overall results management framework. Nor has it established an operational plan necessary to achieve the strategic priorities set out in its Science Plan or to measure progress against those priorities.
- **2.79** Overall, we conclude that Environment Canada is adequately managing the quality and communication aspects of its science activities. However, it has not adequately implemented its Science Plan; that is, it has not moved it from theory into practice.

About the Audit

All of the audit work in this chapter was conducted in accordance with the standards for assurance engagements set by The Canadian Institute of Chartered Accountants. While the Office adopts these standards as the minimum requirement for our audits, we also draw upon the standards and practices of other disciplines.

Objectives

The audit objective for this chapter is to determine whether Environment Canada was adequately managing its science activities and communicating scientific evidence to decision makers.

In this case, adequately managing science activities means that Environment Canada has

- · identified strategic priorities;
- developed operational planning that identifies expected results, accountabilities, resource requirements, and risks to delivering on these priorities;
- · established and incorporated standards of quality; and
- implemented systems and practices for communicating scientific evidence to decision makers and for assessing how well that evidence is being communicated.

Scope and approach

The audit examined the systems and practices in place that enable science to inform decisions related to managing environmental issues, including regulatory and policy-related decisions. The audit examined whether the science activities at Environment Canada incorporated standards of excellence related to quality. The audit did not examine the quality or reliability of the scientific information itself that is provided to decision makers or the quality or reliability of data generated by the Department.

The audit team conducted its examination work through interviews at headquarters and regional offices, and document reviews of relevant information on file. The team reviewed documentary evidence to support information obtained from interviews, including corporate strategies and plans, performance reports, internal and external scientific publications, relevant internal audit and program evaluation reports, systems and practices used by the Department for ensuring and measuring the quality of its science activities, as well as systems for communicating scientific evidence to decision makers and related reports.

The team examined eight selected cases to determine how scientific evidence was being communicated to decision makers within the Department. These cases include

- identification of critical habitat for the Woodland Caribou,
- risk assessment of the toxicity of the siloxanes,
- risk assessment of the toxicity of bisphenol A (BPA),
- climate change negotiations,
- · development of the automobile and light truck greenhouse gas emission regulations,
- smog assessment,

- · development of the wastewater effluent regulations, and
- the Lake Winnipeg scientific assessment.

These cases were selected because they reflected a variety of users and topics relevant to the Department's mandate, but were not representative of all of its decisions.

We did not examine whether or how science was considered by these decision makers or assess the final outcomes of the decisions.

Criteria

Listed below are the criteria that were used to conduct this audit and their sources.

To determine whether Environment Canada was adequately managing its science activities and communicating scientific evidence to decision makers, we used the following criteria:			
Criteria	Sources		
Environment Canada has established priorities for its science	Environment Canada's Science Plan		
activities that are aligned with departmental mandates and priorities.	Mobilizing Science and Technology to Canada's Advantage (2007)		
	In the Service of Canadians: A Framework for Federal Science and Technology		
	Management Accountability Framework VIII, Treasury Board of Canada Secretariat		
Environment Canada has operational (business) plans for its science activities that align with its strategic priorities for	In the Service of Canadians: A Framework for Federal Science and Technology		
science, identify desired results/outcomes, accountabilities, and resource requirements.	 Management Accountability Framework VIII, Treasury Board of Canada Secretariat 		
	Framework for the Management of Risk, Treasury Board (2010)		
Environment Canada's science activities incorporate standards	Environment Canada's Science Plan		
for quality.	Mobilizing Science and Technology to Canada's Advantage (2007)		
	 In the Service of Canadians: A Framework for Federal Science and Technology 		
Environment Canada has systems and practices for	Environment Canada's Science Plan		
communicating scientific evidence to decision makers.	Policy on Information Management, Treasury Board of Canada Secretariat		
	In the Service of Canadians: A Framework for Federal Science and Technology		
Environment Canada has systems and practices for assessing how well it communicates its scientific results to decision	Policy on Management, Resources and Results Structures Treasury Board		
makers.	Management Accountability Framework VIII, Treasury Board of Canada Secretariat		

Management reviewed and accepted the suitability of the criteria used in the audit.

Period covered by the audit

The audit covered the period between 1 April 2007 and 31 March 2011. Audit work for this chapter was substantially completed on 29 July 2011.

Audit team

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Appendix List of recommendations

The following is a list of recommendations found in Chapter 2. The number in front of the recommendation indicates the paragraph number where it appears in the chapter. The numbers in parentheses indicate the paragraph numbers where the topic is discussed.

Recommendation	Response
Communication	
2.54 Environment Canada should develop and implement an approach to assessing the effectiveness of its communication of scientific evidence. (2.37–2.53)	Agreed. The Department recognizes the importance of reviewing and assessing the effectiveness of its communication of scientific evidence to internal decision makers. Effective communication facilitates the use of departmental science to inform the development of policy, programs, regulations, guidelines, and service delivery.
	Further to assessments, evaluations, and other mechanisms that it has in place, the Department will undertake additional activities to assess selected mechanisms used for getting science to targeted internal decision makers by the end of the 2012–13 fiscal year. These assessments will serve as a means to understand if internal decision makers find the communication of scientific evidence to be accessible, timely, and understandable. The Department will use the results of these assessments to further refine and improve communications.
	The Department will also continue to undertake activities to assess the utility and relevance of science for departmental clients, within the context of its ISO 9001 certified weather and environmental services, a significant portion of the Department's science efforts. This type of assessment is a requirement of the Department's formal Quality Management System.

Recommendation

Response

Strategic and operational planning

2.61 Environment Canada should integrate its Science Plan with its results management framework. (2.57–2.60)

2.69 Environment Canada should develop clear and measurable objectives and targets for measuring progress against the long-term directions and meeting the commitments that are set out in its Science Plan and integrate the Plan into its overall planning process. (2.62–2.68)

Agreed. The Department will review the strategic directions in the Science Plan by the end of the 2012–13 fiscal year. This will inform decision making on whether the strategic directions for science need to be updated to reflect new priorities. Following the review, the Department commits to aligning its long-term priorities for science with the departmental results management framework (Program Activity Architecture).

The Department recognizes the importance of aligning science activities to departmental priorities. It is currently doing this through its annual corporate planning and budget allocation process—which includes the development and implementation of operational plans—and existing reporting processes.

Agreed. The Department recognizes that its strategic plans for science should set clear, achievable objectives and that implementation should be achieved through the departmental performance and results management framework (Program Activity Architecture).

The Department's Science Plan sets out a vision that highlighted important challenges for science and the management of science. The Department has made progress reaching the objectives set in the Science Plan, including improvements in getting science to decision makers.

As stated in its response to recommendation 2.61, the Department commits to reviewing the strategic directions in the Science Plan by the end of the 2012–13 fiscal year. The Department commits to developing clear and measurable objectives and targets in order to measure progress on its implementation of the Science Plan by the end of the 2013–14 fiscal year.

Recommendation

2.74 Building on past and current practices, Environment Canada's Science and Technology Branch should establish a periodic external review process for assessing the relevance and quality of the Department's science. (2.70–2.73)

Response

Agreed. In its 2009 document, Measuring Environment Canada's Research & Development (R&D) Performance, the Department reported that the research and development performed by the Department is excellent, world-class science and is aligned with and relevant to users' needs. To build on current practices, the Science and Technology Branch will initiate, by the end of the 2012–13 fiscal year, an externally performed bibliometric study on research and development excellence. In addition, by the end of the 2014–15 fiscal year, the Science and Technology Branch will conduct a follow-up to the 2009 study on measuring research and development performance. These assessments will provide valuable analysis to identify trends, gaps, and/or opportunities regarding the relevance and excellence of science that will further inform planning of external reviews.

The Department assesses the alignment and relevance of all its activities through departmental planning processes for program activities (in the Program Activity Architecture), which integrate science. A significant part of the Department's science is conducted in support of its weather and environmental services, which, as noted in previous responses, conduct regular assessments of the relevance and excellence of the science required for these services, as part of its Quality Management System (ISO 9001).

Report of the Commissioner of the Environment and Sustainable Development—December 2011

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2011



Report of the
Commissioner of the
Environment and
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Chapter 3
Enforcing the Canadian Environmental
Protection Act, 1999





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The December 2011 Report of the Commissioner of the Environment and Sustainable Development comprises The Commissioner's Perspective, Main Points—Chapters 1 to 5, an appendix, and six chapters. The main table of contents for the Report is found at the end of this publication.

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Chapter

3

Enforcing the Canadian Environmental Protection Act, 1999

Performance audit reports

This report presents the results of a performance audit conducted by the Office of the Auditor General of Canada under the authority of the Auditor General Act.

A performance audit is an independent, objective, and systematic assessment of how well government is managing its activities, responsibilities, and resources. Audit topics are selected based on their significance. While the Office may comment on policy implementation in a performance audit, it does not comment on the merits of a policy.

Performance audits are planned, performed, and reported in accordance with professional auditing standards and Office policies. They are conducted by qualified auditors who

- establish audit objectives and criteria for the assessment of performance;
- gather the evidence necessary to assess performance against the criteria;
- report both positive and negative findings;
- · conclude against the established audit objectives; and
- make recommendations for improvement when there are significant differences between criteria and assessed performance.

Performance audits contribute to a public service that is ethical and effective and a government that is accountable to Parliament and Canadians.

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Enforcing the Canadian Environmental Protection Act, 1999

Main Points

What we examined

The Canadian Environmental Protection Act, 1999 (CEPA 1999) is Canada's principal federal environmental statute. It is intended to protect the environment and human health by mitigating and managing risks posed by harmful substances. CEPA 1999 and its regulations govern a variety of environmental matters, including toxic substances, cross-border air and water pollution, and waste disposal. The Act also imposes requirements for pollution prevention planning and emergency plans, and it regulates the interprovincial and international movement of hazardous wastes and recyclable materials.

Environment Canada's enforcement program is aimed at ensuring that individuals, companies, and government agencies comply with the pollution prevention and conservation goals of environmental and wildlife protection Acts and regulations, including CEPA 1999.

The enforcement of CEPA 1999 is carried out by the Department's Environmental Enforcement Directorate, comprising a national office and five regional offices across Canada whose activities include monitoring and enforcing regulatory compliance.

We examined whether Environment Canada's enforcement program was well managed to adequately enforce compliance with CEPA 1999. We assessed whether the Department has applied a risk-based approach to plan its enforcement activities and target the greatest threats to human health and the environment; enforced the law in a fair, predictable, and consistent way, as the Act requires; measured the results of its enforcement activities; and acted on identified opportunities for improvement.

Audit work for this chapter was completed on 11 October 2011.

Why it's important

CEPA 1999 states that the protection of the environment is essential to the well-being of Canadians and that the primary purpose of the Act is to contribute to sustainable development through pollution prevention. According to Environment Canada, environmental laws alone are not enough to guarantee a cleaner, better environment. These laws also need to be enforced. Enforcing CEPA 1999 is therefore an important part of protecting the health of Canadians, biodiversity, and the quality of Canada's air, soil, and water.

According to Environment Canada, enforcement of the law can encourage behavioural changes needed to protect the environment and human health by preventing and managing risks posed by toxic and other harmful substances.

What we found

- The enforcement program has not been well managed to adequately enforce compliance with the Canadian Environmental Protection Act, 1999 and ensure that threats to Canadians and their environment from pollution are minimized. The Environmental Enforcement Directorate lacks key information on regulated individuals, companies, and government agencies to know whether it is targeting its enforcement activities toward the highest-risk violators or the highest risks to human health and the environment, as called for by Environment Canada's own environmental enforcement policy.
- The Department's enforcement actions are limited by gaps in its
 capacity to enforce CEPA regulations. Many of the factors it considers
 in setting priorities for enforcement have nothing to do with risks to
 human health or the environment or with the past record of
 compliance of those regulated. Instead, some regulations are excluded
 from being priorities due to lack of adequate training for enforcement
 officers or lack of adequate laboratory testing to verify compliance.
- The Environmental Enforcement Directorate failed to follow up on half of its enforcement actions during the audit period to verify that violators returned to compliance with CEPA regulations.
 In addition, often it did not apply key management controls to ensure that enforcement officers applied the Act in a fair, predictable, and consistent manner across the country, as called for by the Act.
- The Department has been slow to act on significant shortcomings
 that continue to impede successful enforcement, such as inadequate
 gathering and analysis of information to inform enforcement planning
 and targeting, and inadequate training of enforcement officers.
 Furthermore, Environment Canada is not measuring the results of its
 enforcement activities and actions and does not know whether they
 have achieved the program objectives of encouraging compliance and
 minimizing damages and threats to the environment.

The Department has responded. Environment Canada agrees with our recommendations and has provided responses. However, it disagrees with our findings and conclusions. We elaborate on the disagreement at the end of the Conclusion section of this chapter.

Information contained in the Department's responses to our audit recommendations contradicts our audit evidence. The Department was not able to provide evidence to support the representations made in its responses.

Introduction

- 3.1 The health of Canadians and Canada's long-term economic competitiveness are linked to the quality of the natural environment. Environmental laws and regulations are intended to protect air, soil, and water quality; biodiversity; and public health by controlling the discharge of pollutants into the environment. These laws also restrict the use of certain substances and set limits on the quantity or concentration of substances allowed to be used, released to the environment, or contained in a product. To do so, however, they must be effectively enforced.
- 3.2 Successful enforcement will ensure that regulated individuals, companies, and government agencies act in a way that achieves the objectives of environmental regulations. By creating negative consequences for violations of the law, enforcement deters illegal conduct. Deterrence is further strengthened when potential violators determine that those consequences—penalties such as fines and jail time—outweigh the potential benefits of non-compliance.

The Canadian Environmental Protection Act, 1999

3.3 The Minister of the Environment is responsible for the administration of a number of environmental statutes, including the Canadian Environmental Protection Act, 1999 (CEPA 1999). CEPA 1999 is the federal government's principal environmental statute. The Act is intended to protect the environment and human health by preventing and managing risks posed by toxic and other harmful substances. It regulates the management of risks associated with these substances—including cross-border air and water pollution and the interprovincial and international movement of hazardous wastes and recyclable materials—through measures such as concentration limits, permits, pollution prevention plans, and environmental emergency plans. Exhibit 3.1 lists the regulations under CEPA 1999.

Exhibit 3.1 Canadian Environmental Protection Act, 1999 Regulations

- 1. 2-Butoxyethanol Regulations
- 2. Asbestos Mines and Mills Release Regulations
- 3. Benzene in Gasoline Regulations
- 4. Chlor-Alkali Mercury Release Regulations
- Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations
- 6. Contaminated Fuel Regulations
- 7. Disposal at Sea Regulations
- 8. Environmental Emergency Regulations
- Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations
- 10. Export Control List Notification Regulations
- 11. Export of Substances Under the Rotterdam Convention Regulations
- 12. Federal Halocarbon Regulations, 2003
- 13. Federal Mobile PCB Treatment and Destruction Regulations
- 14. Fuels Information Regulations, No. 1
- Gasoline and Gasoline Blend Dispensing Flow Rate Regulations
- 16. Gasoline Regulations
- 17. Interprovincial Movement of Hazardous Waste Regulations
- 18. Marine Spark-Ignition Engine, Vessel and Off-Road Recreational Vehicle Emission Regulations
- 19. Masked Name Regulations
- 20. New Substances Fees Regulations
- 21. New Substances Notification Regulations (Chemicals and Polymers)
- 22. New Substances Notification Regulations (Organisms)
- 23. Off-Road Compression-Ignition Engine Emission Regulations
- 24. Off-Road Small Spark-Ignition Engine Emission Regulations
- 25. On-Road Vehicle and Engine Emission Regulations
- 26. Ozone-depleting Substances Regulations, 1998
- 2.7 Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations

- 28. PCB Regulations
- 29. PCB Waste Export Regulations, 1996
- 30. Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations
- 31. Persistence and Bioaccumulation Regulations
- 32. Phosphorus Concentration Regulations
- 33. Polybrominated Diphenyl Ethers Regulations
- 34. Prohibition of Certain Toxic Substances Regulations, 2005
- 35. Pulp and Paper Mill Defoamer and Wood Chip Regulations
- 36. Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations
- 37. Regulations Adding Perfluorooctane Sulfonate and Its Salts to the Virtual Elimination List
- 38. Regulations Prescribing Circumstances for Granting Waivers Pursuant to Section 147 of the Act
- 39. Regulations Respecting Applications for Permits for Disposal at Sea
- 40. Release and Environmental Emergency Notification Regulations
- 41. Renewable Fuels Regulations
- 42. Rulès of Procedure for Boards of Review
- 43. Secondary Lead Smelter Release Regulations
- 44. Solvent Degreasing Regulations
- 45. Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations
- 46. Sulphur in Diesel Fuel Regulations
- 47. Sulphur in Gasoline Regulations
- 48. Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations
- 49. Tributyltetradecylphosphonium Chloride (TTPC) Regulations
- 50. Vinyl Chloride Release Regulations, 1992
- 51. Virtual Elimination List
- 52. Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations
- 53. Volatile Organic Compound (VOC) Concentration Limits for Automotive Refinishing Products Regulations

Environment Canada's enforcement program

- The goal of Environment Canada's enforcement program is to ensure that damages and threats to the natural environment, its ecosystems, and biodiversity are minimized through the enforcement of legislation administered by Environment Canada for the benefit of all Canadians and the international community. The enforcement program aims to ensure that individuals, companies, and government agencies comply with the pollution prevention and conservation goals of environmental and wildlife protection acts and regulations.
- 3.5 In 1998, a parliamentary review of the Canadian Environmental Protection Act concluded that "Canadians [were] not getting the high level of environmental protection that they expect and deserve," and that a number of problems were precluding effective enforcement, including a lack of both human and financial resources. Environment Canada made significant organizational changes to its enforcement program in 2005, establishing an independent Environmental Enforcement Directorate managed nationally under a Chief Enforcement Officer who reports directly to the Deputy Head of the Department. The Directorate consists of a national head office and five regional offices. Each region is tasked with carrying out the Directorate's National Enforcement Plan. The Directorate is responsible for enforcing CEPA 1999 as well as the Fisheries Act.
- In 2007, the government stated that it would bolster the protection of water and land through tougher environmental enforcement that would make polluters accountable. The government increased Environment Canada's funding to hire new enforcement officers, increase enforcement activity, and reinforce support functions, such as training, intelligence, and information management. Since 2007, the Department's environmental enforcement budget has increased by \$3.4 million and 40 full-time-equivalent positions.
- In the 2010–11 fiscal year, the Environmental Enforcement 3.7 Directorate had 214 full-time-equivalent staff, and total spending was \$20 million for enforcing CEPA 1999 and the Fisheries Act. This figure represents approximately 2 percent of Environment Canada's planned spending. Environment Canada officials estimated that approximately 60 percent of the Directorate's inspection resources are assigned to enforce CEPA regulations, while the remaining 40 percent of inspection resources are assigned to enforce the Fisheries Act.

5

- A range of activities contributes to compliance with the Act, including drafting regulations that are enforceable, promoting compliance, and enforcing compliance with regulations.
- The enforceability of a regulation depends on a number of factors, including clear language and definitions, adequate training of enforcement officers, and the availability of analytical methods and laboratory tests to detect compliance.
- 3.10 Promoting compliance involves encouraging conformity with the law through information and education programs to increase awareness and understanding of the law and its regulations. Enforcing compliance involves
 - inspections;
 - investigations of violations;
 - enforcement actions to compel compliance without resorting to formal court action, such as warnings, tickets, and environmental protection compliance orders; and
 - court actions such as injunctions, prosecution, court orders upon conviction, and civil suits for the recovery of costs.
- 3.11 Exhibit 3.2 presents the number and types of enforcement actions taken under CEPA 1999 in 2010-11.
- 3.12 Environment Canada's Compliance and Enforcement Policy for CEPA 1999 defines compliance as the state of conformity with the law. Both the Act and the policy stipulate that enforcement officers throughout Canada will apply the Act in a manner that is "fair, predictable, and consistent." The policy also states that the desired result of enforcement actions is compliance with the Act within the shortest possible time and with no further violation.

Previous audits

- 3.13 As noted earlier, in addition to CEPA 1999, the Environmental Enforcement Directorate is responsible for enforcing the pollution prevention provision of the Fisheries Act. In 2009, we audited Environment Canada's enforcement of the Fisheries Act (Spring 2009 Report of the Commissioner of the Environment and Sustainable Development, Chapter 1—Protecting Fish Habitat).
- 3.14 We found that Environment Canada actively administered two of the six Fisheries Act regulations for which it had responsibility. The remaining four regulations, which dated to the 1970s, were not actively administered. We also found that the Department did not use

a risk-based approach to identify, assess, and address risks associated with non-compliance with the Fisheries Act that could lead to significant harm to fish habitat.

- 3.15 In our 2008 audit of air emissions, we looked at Environment Canada's enforcement of three fuels regulations under CEPA 1999 (December 2008 Report of the Commissioner of the Environment and Sustainable Development, Chapter 1—Managing Air Emissions).
- **3.16** We found that the Department had not assessed the sufficiency of its approach to enforcing the fuels regulations, had not completely identified the community to be regulated, and had done little to enforce the flow rate regulations for gasoline.

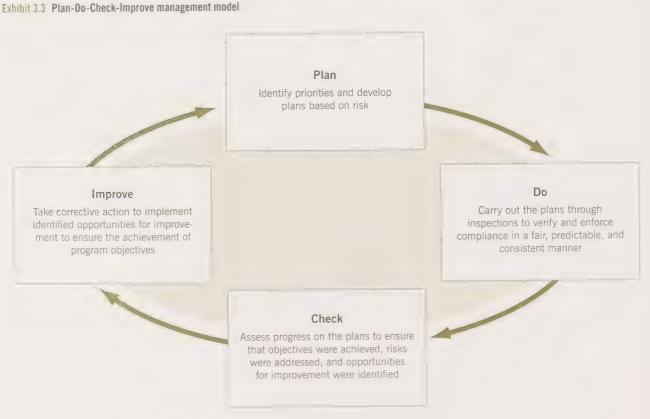
Exhibit 3.2 Number and types of CEPA 1999 enforcement actions taken in 2010-11

Enforcement actions	Description		
Tickets	Tickets are issued to the regulatees for offences where there is minimal or no threat to the environment or human life or health.	0	
Written warnings	Written warnings are formal written notices to inform the regulatees of a minor violation and to request corrective action.		
Written directives	Written directives are official or authoritative instructions that oblige regulatees to take all reasonable actions to remedy any dangerous condition or to reduce any danger to the environment.		
Injunctions	Injunctions are actions by the Minister to stop or prevent violations of the Act.		
Ministerial orders	Ministerial orders require prompt and immediate action by regulatees to prevent unlawful manufacture, importation, distribution, or sale of a substance or a product containing a substance, or to recall the substance or product from the marketplace.		
Environmental protection compliance orders	invironmental protection compliance orders direct violators to take the measures equired to comply with the Act and associated regulations.		
Environmental Protection Alternative Measures	the state of the s		
Prosecutions	Prosecution is a legal proceeding for the purpose of determining the guilt or innocence of an accused regulatee.		
Convictions	The number of convictions (excluding tickets) is the number of counts where the regulatee was found guilty or pleaded guilty.	0	

Sources: Adapted from Environment Canada enforcement data and the Compliance and Enforcement Policy for the Canadian Environmental Protection Act, 1999

Focus of the audit

- 3.17 We examined how Environment Canada manages its environmental enforcement program to determine whether the Department adequately enforced compliance with the Canadian Environmental Protection Act, 1999. While we examined questions related to the contribution of compliance promotion activities and the enforceability of CEPA 1999 regulations, this audit focused on the management of Environment Canada's enforcement activities.
- 3.18 We assessed the management of Environment Canada's enforcement program using the "Plan-Do-Check-Improve" model (Exhibit 3.3). Given the cyclical nature of these management activities, our audit covered five fiscal years, from 2006–07 to 2010–11; we judged this period sufficient to allow for a complete management cycle.
- 3.19 Our audit work on enforcement planning and measuring performance focused on the most recent planning and reporting cycle. Our audit work on implementing enforcement plans and taking action on areas identified for improvement covered four years in order to



Source: Adapted from ISO 9000 series on quality management

allow the Department the opportunity to follow up with violators and take corrective action on identified opportunities for improvement.

3.20 More details about the audit objectives, scope, approach, and criteria are in **About the Audit** at the end of this chapter.

Observations and Recommendations

- 3.21 Well-managed programs operate according to a systematic management cycle consisting of planning, doing, checking, and improving. In examining Environment Canada's enforcement program for the Canadian Environmental Protection Act, 1999, we looked for evidence that
 - the program applied a risk-based approach to identify enforcement priorities and develop enforcement plans;
 - enforcement activities were conducted in a fair, predictable, and consistent manner:
 - progress was checked to ensure that objectives were achieved, risks addressed, and opportunities for improvement identified; and
 - improvements were made to ensure that program objectives are achieved.

Risk-based planning

- 3.22 Since the Canadian Environmental Protection Act, 1999 (CEPA 1999) was enacted, the number of CEPA 1999 regulations has more than doubled: from 26 when the Act was brought into force to 53 in 2011. Forty-five of these regulations have an enforcement component while eight serve to clarify various sections of the Act. According to Environment Canada, the large and growing number of regulations under CEPA 1999 has increased the challenge of gathering and maintaining information on the regulated communities, developing and providing training for enforcement officers, and allocating resources to address the greatest threats to human health and the environment.
- 3.23 There are tens of thousands of individuals, companies, and government agencies in Canada that are subject to CEPA 1999 regulations. Since it is not possible to inspect all regulatees in order to verify their compliance, a risk-based approach is essential to target Environment Canada's enforcement resources to the substances, activities, and regulatees that pose the greatest risks to human health and the environment.

Enforcement Policy for the Canadian Environmental Protection Act, 1999, a number of considerations influence the selection of enforcement priorities. Importantly, the policy states that "the schedule of inspections will be determined by the risk that the substance or activity presents to the environment or to human health, and by the compliance record of the individual, company or government agency." In addition, according to documentation provided by the Department, its National Enforcement Plan is based on the analysis of compliance issues and trends. We examined whether the Environmental Enforcement Directorate reviewed these risks and the compliance records of regulated individuals, companies, and government agencies as required by its policy to identify compliance issues and trends and establish its national enforcement priorities for the current year.

The Environmental Enforcement Directorate uses a methodical, risk-based approach to identify enforcement priorities

- 3.25 To establish its enforcement priorities, the Department's Environmental Enforcement Directorate calls upon knowledgeable experts across Environment Canada to complete a planning submission form for each CEPA regulation. The form sets out a number of criteria intended to help the Directorate determine whether a regulation should be an enforcement priority. The criteria include
 - the level of risk to the environment and human health represented by the regulated substance or activity,
 - the compliance history of the regulated community,
 - the visibility of the regulation or controlled substance,
 - · the availability of training for enforcement officers, and
 - the availability of laboratory and analytical methods to determine compliance.
- 3.26 Based on these submissions and a three-day consultation with departmental experts, the Environmental Enforcement Directorate ranks regulations by level of risk to set enforcement priorities for the National Enforcement Plan for the given year.
- 3.27 The enforcement planning process for the 2011–12 fiscal year classified the regulations under CEPA 1999 into three categories—priority, maintenance, and referral. The classification determines the level of effort that will be applied and the enforcement approach (Exhibit 3.4). Regulations classified as priority and maintenance are

actively enforced through inspections. Regulations classified as referrals are enforced if and when the Department receives notice about a pollution incident or a potential violation of the Act.

3.28 Since the planning documentation we examined did not indicate that the Directorate had ranked the 26 referral regulations by level of risk, we asked the Directorate to provide us with its reasons for classifying these regulations as referrals. The Department provided us with an explanation for each of these regulations. For example, in a number of cases, the reason provided to us was that no planning submission was received by the Directorate and that the regulation had not been identified by program managers as a consideration for enforcement. In other cases, we were told that regulations that require the regulated community to report on its activities cannot be proactively enforced. We were unable to determine whether the Directorate's rationale and reactive approach to enforcing these regulations was appropriate.

Exhibit 3.4 The Department has prioritized CEPA 1999 regulations to determine the enforcement approach and assignment of resources

Classification of the regulations	Enforcement approach	Number of regulations	Level of effort (percentage of available enforcement resources)
Priority	Actively enforced	4	50–60%
Maintenance	Actively enforced	15	30%
Referral	Enforced in reaction to complaints or notification from outside the Environmental Enforcement Directorate	26	10–20%

Source: Adapted from Environment Canada's 2011-12 National Enforcement Plan

The Environmental Enforcement Directorate lacks key information to identify risks

3.29 CEPA 1999 empowers Environment Canada to obtain information from the regulated community on substances and activities regulated under the Act. According to the Directorate, reports from the regulated community are required for 28 CEPA regulations. These reports are essential in helping Environment Canada to identify the regulated communities for these CEPA regulations and to understand aspects of their operations such as

volumes of substances used, emissions, or discharges. In addition, these reports are crucial because they provide the Department with more extensive information for compliance verification and enforcement planning than could practically be obtained through inspections. For example, the *Benzene in Gasoline Regulations* require regulatees to submit annual reports on fuel composition as well as annual audit reports on their compliance with the regulation (for more information on the enforcement of the *Benzene in Gasoline Regulations*, see our December 2008 Report, Chapter 1—Managing Air Emissions, paragraphs 1.16 to 1.32).

- 3.30 We examined whether the Department had obtained the required reports from regulatees for nine regulations with regular reporting requirements that it had classified as enforcement priorities over the last five years. We found that, for six of these nine regulations, the Department did not know whether it had obtained the required reports. As a result, the Environmental Enforcement Directorate lacked key information on the activities and compliance of regulatees to determine risk and develop its National Enforcement Plan. Furthermore, failure to report is itself a regulatory violation, which means that the Directorate lacked the information it needed to know whether regulatees were complying with the reporting requirements of these regulations.
- 3.31 We also examined the planning submissions that the Environmental Enforcement Directorate received from departmental experts for the 2011–12 planning cycle to determine whether they addressed risks to the environment and human health and whether compliance records, issues, and trends were considered in the planning process, in accordance with the Department's enforcement policy for CEPA 1999.
- 3.32 We found that the planning submissions contained information on the risk to the environment and human health posed by the regulated substance or activity. For example, the submission for the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations indicates that chemicals from a number of sectors, including manufacturing, petroleum, and mining, as well as from materials such as electronics, scrap materials, and used lubricants, pose a "mild to severe impact on human health and the environment." This impact depends on the size and nature of the release if the chemicals are not managed, recovered, or disposed of in an environmentally sound manner.
- 3.33 We also found that the submissions characterized overall compliance with the regulation as low, medium, or high. However,

given the absence of specific information on which regulated individuals, companies, or government agencies posed the greatest threats as a result of non-compliance, we asked the Department for the following information for each regulation:

- a list of the regulated individuals, companies, and government agencies; and
- a list of the regulatees that pose the greatest risk for environmental harm or damage, as a result of non-compliance.
- 3.34 In response to our request, the Department provided lists of the regulated communities for many of the regulations it plans to actively enforce. For some of the regulations, officials told us that the regulated community is small, stable, and well known to the Department, and therefore that lists of the regulated individuals, companies, and government agencies were unnecessary. However, we found considerable uncertainty within the Department about the regulated communities. For example, a quarter of the planning submissions, including those for two of the Department's four enforcement priorities, indicated that there is a large unknown number of regulatees. The planning submission for the *Federal Halocarbon Regulations*, 2003, for instance, indicates that the number of unknown regulatees is very large. These regulations were brought into force in 2003 and are aimed at reducing halocarbon emissions to prevent damage to the ozone layer.
- 3.35 With respect to compliance information, we found no evidence that the Directorate had analyzed compliance records to identify significant compliance issues and trends across the 45 CEPA regulations for the purpose of setting priorities in the National Enforcement Plan. The Directorate told us that it does not keep a record of the regulatees that pose the greatest risk for environmental harm or damage, as a result of non-compliance.
- 3.36 Although we found that the Directorate uses a methodical, risk-based approach to determine its enforcement priorities, the Department lacks key information to identify risks, including information reported by the regulated community and information on who is being regulated and who poses the greatest risk for environmental harm or damage. Consequently, it does not know whether its National Enforcement Plan identifies the regulatees and activities that pose the greatest risks to human health or the environment as a result of non-compliance.

- 3.37 Without a clear understanding of which regulatees pose the greatest threats to human health and the environment, the Directorate cannot assure parliamentarians and Canadians that it is targeting its enforcement resources toward the highest-risk violators or fulfilling its own enforcement policy.
- 3.38 Recommendation. The Environmental Enforcement Directorate should put in place procedures to help identify regulatees and reduce uncertainty about specifically whom it is regulating under each regulation that has an enforcement component.

The Department's response. Agreed. Environment Canada acknowledges that in some cases it would be beneficial to establish procedures to systematically maintain accurate and up-to-date lists of the regulated parties. It is important to emphasize, however, that it is neither necessary nor feasible to always maintain a comprehensive list of all regulated parties. For example, regulated communities are not always completely inventoried for new regulations. The departmental approach is to progressively build knowledge of the regulated community by targeting larger companies first and then further identifying smaller and more dispersed ones. This incremental approach has proven to be a cost-effective method to identify regulatees for compliance promotion and enforcement purposes.

The Department does not agree with the report's conclusion that key information on regulatees is missing and that, as a result, the Department's ability to target its enforcement activity to highest risk offenders is hindered. Environment Canada's existing practices maintain an appropriate level of information on its regulated communities drawn from a number of sources which varies depending on the nature of the regulation.

The Department will continue to improve its processes for updating relevant information about regulatees on a regular and consistent basis as part of the updating of Compliance Strategies and the annual Compliance Priority Planning Process.

3.39 Recommendation. The Environmental Enforcement Directorate should obtain and analyze information on compliance issues and trends to establish priorities in its National Enforcement Plan and ensure that it is targeting its enforcement resources toward the individuals, companies, and government agencies that pose the greatest threats to the environment and human health.

The Department's response. Agreed. The Department employs a rigorous risk-based approach to enforcement planning, where threats and risks to the environment and human health are factors in priority decision making, as was noted in the audit. Priority setting for the enforcement of the Canadian Environmental Protection Act, 1999 draws on knowledge and expertise at both the national and regional levels. Once national priorities for compliance verification have been established, regions undertake local targeting, where compliance histories are considered by operational managers and inspectors in developing local plans.

Environment Canada agrees, however, that the CEPA enforcement planning process could benefit from information drawn from a more systematic approach to compliance trends analysis where feasible.

In order to further improve the existing national risk-based CEPA enforcement planning process, where it is feasible, practical, and beneficial, Environment Canada will analyze existing compliance information and will produce sectoral compliance rate statistics for selected sectors to aid in priority setting and track compliance results over time.

Lack of training and laboratory testing methods limit enforcement

- 3.40 In setting its enforcement priorities, the Environmental Enforcement Directorate considers a number of factors, including risk to human health and the environment (see paragraph 3.25). Regardless of these risks, it excludes from its enforcement priorities those regulations for which the needed specialized training or laboratory testing methods have not been developed.
- **3.41** According to the Directorate, 30 of the 45 CEPA regulations with an enforcement component require specialized training because of their complexity. There was no training course in place for 16 of these regulations. Five that require a laboratory test to enforce the regulation did not have one available (Exhibit 3.5). The Department needs to lay the foundation for effective enforcement by ensuring these basic requirements are in place before new regulations are brought into force (see our recommendation at paragraph 3.71).
- 3.42 We found that enforcement priorities are determined primarily on the basis of the Department's capacity to enforce the regulations. Management told us that the large and growing number of regulations under CEPA 1999 has increased the challenge of developing and providing training in a timely manner.

Exhibit 3.5 For some CEPA 1999 regulations with high levels of risk, the Department does not have the training or laboratory tests needed for enforcement

2-Butoxyethanol Regulations

2-Butoxyethanol (2-BE) is a toxic substance regulated under the *Canadian Environmental Protection Act, 1999*, because it poses a danger to human life and health. It is used in a wide range of consumer and institutional products, such as cleaners, paints, and coatings, which are routinely used in schools and hospitals.

The 2-BE regulations aim to limit the concentration of this substance in products designed for indoor use to reduce human exposure to below potentially harmful levels. The enforcement plan for this regulation included conducting inspections with sampling of regulated products and reviewing documents related to the ingredients of those products.

In the 2011–12 planning process, the Department determined that non-compliance with this regulation poses a high risk to human health. The Department's list of the regulated community indicates that there are 214 regulatees. Despite the fact that these regulations have been in force since December 2007 (for manufacturers and importers) and December 2008 (for sellers), the laboratory test needed to enforce this regulation was developed in late 2010, and is unaccredited in some provinces. The Environmental Enforcement Directorate has conducted three inspections since this regulation came into force.

Perfluorooctane Sulfonate and its Salts and Certain Other Compounds Regulations

Perfluorooctane Sulfonate (PFOS) substances are considered toxic under the Act because they pose serious, irreversible impacts through bioaccumulation and persistence in the environment. In Canada, PFOS has been detected in species such as fish, fish-eating birds, and Arctic marine mammals far from known sources. The effects of PFOS include inhibiting the growth of birds and aquatic invertebrates, causing liver and thyroid effects in mammals, killing fish and saltwater invertebrates, and changing biodiversity. PFOS releases have also been found to cause groundwater contamination up to five years after its release.

The PFOS regulations aim to achieve the lowest level of releases to the environment that is technically and economically feasible. PFOS is used in the metal plating sector and as a component of foams used for firefighting. It may also be contained in imported items such as water, oil, soil and grease repellents (for example, on fabric, leather, paper, packaging, rugs and carpets) and as surfactants (for example, coating additives). Despite the voluntary phase-out of PFOS production by major global manufacturers, the Department was concerned about the compliance of imported clothing. Enforcement costs were expected to amount to approximately \$570,450 over a 25-year time frame, including between \$56,220 and \$74,316 per year for the first five years.

In the 2011–12 planning process, the Department determined that non-compliance with this regulation poses a high risk to the environment. The Department's list of the regulated community indicates that there are 414 regulatees. However, the planning submission from Environment Canada experts also indicated that there is a high number of unknown regulatees. While this regulation came into force in May 2008, two inspections have been conducted to date. The Department has indicated that the training and laboratory support needed to enforce this regulation is not yet in place.

Enforcing the Act

Fair, predictable, and consistent enforcement of the Act is not assured

3.43 According to the Canadian Environmental Protection Act, 1999 (CEPA 1999) and Environment Canada's Compliance and Enforcement Policy for CEPA 1999, enforcement officers throughout Canada must apply the Act in a manner that is fair, predictable, and consistent. Lack of fairness, predictability, and consistency in applying the Act across the Environmental Enforcement Directorate's five regions could potentially create pollution havens in various regions of the country or affect the outcome of future litigation.

3.44 The Compliance and Enforcement Policy

- sets out the enforcement actions available to enforcement officers, such as warnings, directions, tickets, compliance orders, and injunctions;
- establishes criteria for choosing the appropriate action; and
- calls for follow-up to verify adherence to past enforcement actions and to verify that the regulatee has returned to compliance.

In addition, the policy states that the desired result of enforcement activities is compliance with the Act within the shortest possible time and with no further occurrence of violation. Consistent and predictable use of enforcement actions and follow-up are keys to fairness in enforcing the law.

- 3.45 The enforcement program has developed an Internal Decision Making Process, which consists of management controls intended to ensure fair, predictable, and consistent enforcement of the Act across Canada. The enforcement program has also created standards that require enforcement officers and managers to record their enforcement activities and approvals in the National Emergency and Enforcement Management Information System and Intelligence System (NEMISIS). Developed in 1998, NEMISIS is intended to contain the Department's record of pollution occurrences, inspections, investigations, and enforcement actions. We confirmed with management that NEMISIS is the Department's core repository for enforcement activities.
- 3.46 We examined representative samples of the Directorate's NEMISIS enforcement files to determine whether the Directorate applied key management controls from its Internal Decision Making Process to ensure that enforcement actions are applied in a fair, predictable, and consistent manner. We selected two key management controls that were both in place throughout the audit period and were mandatory requirements.

Environmental protection compliance orders —Orders that direct alleged violators to take the measures required to comply with the Canadian Environmental Protection Act, 1999 and associated regulations. While the order imposes no financial or other penalty, failure to comply with the order is a prosecutable offence.

- 3.47 To ensure a consistent approach to enforcement in situations where a violation did not result in an enforcement action such as a warning or a ticket, the Department requires that management approve the closure of the file. In 40 percent of the 1,076 files, we found no evidence that this control had been applied. Enforcement officers are also required under the Internal Decision Making Process to obtain management approval prior to issuing environmental protection compliance orders (EPCO). In about 25 percent of the 107 EPCOs issued, we found no evidence that the necessary management approvals were obtained.
- 3.48 In addition, we examined whether the Directorate had complied with its enforcement policy to follow up with violators to verify that they had returned to compliance. Management told us that it applied a risk-based approach to follow up and that a follow-up inspection was not always warranted. Nevertheless, management confirmed that there should be some record in NEMISIS, such as a record of a telephone call or an email, to confirm that the enforcement officer verified a return to compliance.
- 3.49 In half of all cases, we found no evidence that enforcement officers followed up. In those cases where the Directorate confirmed a return to compliance, an average of approximately 300 days had elapsed since the enforcement action. Although the Department's enforcement policy is to ensure compliance with the Act "within the shortest possible time and with no further occurrence of violation," the Directorate has no set time frame for this activity.
- **3.50** Recommendation. The Environmental Enforcement Directorate should apply its key controls to ensure that enforcement actions are conducted in a manner that is fair, predictable, and consistent across its five regional offices in accordance with CEPA 1999.

The Department's response. Agreed. The Environmental Enforcement Directorate agrees that the management controls identified in the audit, data entry and record keeping for enforcement actions need to be improved and will ensure that they conform to its Internal Decision Making Process, with a particular emphasis on better documenting management approvals of enforcement actions by Winter 2012.

The Department does not agree that weaknesses in these management controls affect its ability to ensure the fair, predictable and consistent enforcement of CEPA. There are legal, structural and programmatic checks and approvals within the CEPA framework in addition to the management controls examined in the audit that ensure fairness and

consistency. Officers receive training on the use of tools such as Environmental Protection Compliance Orders (EPCO): prior to the issuance of an EPCO, officers serve a Notice of Intent, providing the regulatee an opportunity to make representations; the Department of Justice assists in the drafting of the order to ensure measures chosen are appropriate and supportable in law; and, regulatees may appeal an order to an independent quasi-judicial authority, the CEPA Chief Review Officer (CRO). Between 2006–07 to 2010–11, 107 EPCOs were issued. Only 3 were appealed to the CRO. Two were upheld, with the third CRO ruling in favour of the regulatee. The Crown appealed that ruling to Federal Court, where the original EPCO was upheld and reinstated. The findings demonstrate that the system as a whole is functioning well.

Additional resources have not resulted in more enforcement activity

3.51 We reviewed the Department's enforcement activities since the 2006–07 fiscal year, when additional funds were approved for the Department to hire 68 environmental enforcement officers. Environment Canada expected that the additional enforcement resources would lead to an increase in the number of inspections for some CEPA 1999 regulations.

3.52 We found that the additional enforcement resources had not yet had the intended effect on the number of inspections (Exhibit 3.6). In addition, the Directorate was unable to tell us how many of the 40 full-time-equivalent positions added since 2007 are environmental enforcement officers.

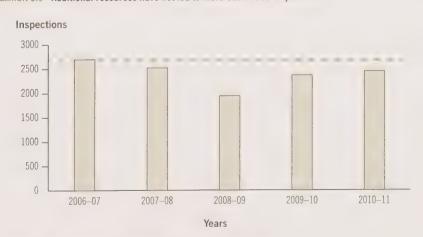


Exhibit 3.6 Additional resources have not led to more CEPA 1999 inspections

Source: Data on inspections adapted from CEPA 1999 annual reports

Measuring performance

The Environmental Enforcement Directorate does not measure its results

- **3.53** Assessing program performance relative to expected results is a key feature of the cyclical Plan-Do-Check-Improve management model.
- 3.54 While our audit focused on the management of the enforcement program, Environment Canada officials told us that compliance promotion plays a key role in securing compliance with the Act. Accordingly, we examined whether both the environmental enforcement and compliance promotion functions measure and report program performance relative to expected results.
- 3.55 The goal of the enforcement program is to ensure that damage and threats to the natural environment, its ecosystems, and biodiversity are minimized by enforcing the law. The desired result of enforcement activities is compliance with the Act within the shortest time possible and with no further violation of the law.
- 3.56 We found that the Environmental Enforcement Directorate tracks activities and outputs: for example, the number of inspections it completes and the types of enforcement actions it takes, such as issuing warning letters, in response to violations. However, the Directorate has not assessed the extent to which its enforcement activities and actions influence the compliance of regulatees. Neither has it measured progress against its goal to ensure that damage and threats to the natural environment, its ecosystems, and biodiversity are minimized. Environment Canada has not established performance expectations for promoting compliance and does not measure the contribution of its compliance promotion activities to regulatory compliance.
- 3.57 As a result, the Department does not know which activities and actions are the most effective in influencing the regulated community to comply with the Act or whether its enforcement program is achieving expected results.
- 3.58 The lack of performance information on the enforcement of the Canadian Environmental Protection Act has been a long-standing issue, first identified over a decade ago by the Standing Committee on Environment and Sustainable Development in 1995.
- 3.59 Measuring the performance of environmental enforcement programs is difficult. The Organisation for Economic Co-operation and Development (OECD) has identified key challenges for developing and using performance measures for environmental enforcement programs, including uncertainty in linking enforcement

activities and actions with environmental improvements. It has also identified a number of examples of how the performance of environmental enforcement programs can be measured (Exhibit 3.7).

Exhibit 3.7 The OECD has identified current practices for measuring the performance of environmental enforcement programs

Measurement category	Examples
Compliance rates	Percentage of facilities inspected that were found to have significant violations
	Number of serious violations of permit conditions
Repeat violations	Level of repeat violations following criminal conviction
and duration of non-compliance	Percentage of facilities returning to compliance after receiving a compliance order
Pollution releases	Mass of pollutants reduced, treated, or eliminated through enforcement actions.
	Emissions of air pollutants
	Number of serious pollution incidents
Environmental management practices	Dollars invested in improved environmental performance as a result of enforcement actions
and reduced risk	Number of businesses with high risk scores
	Number of regulated entities changing behaviour as a result of enforcement
Environmental quality	Area of wetlands restored or improved

Source: Adapted from Outcome Performance Measures of Environmental Compliance Assurance:
Current Practices, Constraints and Ways Forward—OECD Environmental Working Paper
No. 18, 2010

3.60 Recommendation. The Environmental Enforcement Directorate should establish performance standards for following up with violators to verify that they return to compliance within the shortest time possible and with no further violation of the Act.

The Department's response. Agreed. The Environmental Enforcement Directorate will establish standards for compliance verification in response to all enforcement actions resulting from non-administrative violations by Winter 2011–12. It is important to distinguish, however, between the treatment of different classes of violations and the enforcement actions chosen to deal with each. Where an officer has issued an EPCO, legally binding timelines for a return to compliance are established and schedules are monitored closely. Where a warning letter is issued for a one-time minor release and where the regulatee promptly reports and takes measures to stop

and permanently fix the deficiency at the time of the release, follow-up verification is not necessary nor is it an effective deployment of resources. Follow-up for administrative violations will continue to be dealt with on a case-by-case basis, where factors such as potential environmental or human heath risks and the regulatee's compliance history will be considered.

3.61 Recommendation. The Environmental Enforcement Directorate should assess the contribution of its enforcement activities to regulatory compliance as a basis for enforcement planning and continual improvements to the enforcement program.

The Department's response. Agreed. Environment Canada will conduct a pilot project over 2011–13 to calculate sectoral compliance rate statistics for selected sectors, where feasible, and analyze resultant compliance trends in light of enforcement and compliance promotion actions. The pilot project will determine the feasibility of any broader application.

The Department will also continue to use and refine information about environmental risks to inform the planning of its enforcement activity. However, measuring absolute environmental outcomes and the contribution of specific activities to those outcomes remains a difficult methodological challenge for organizations around the world, including Environment Canada, as reflected by the primarily output measures identified in Exhibit 3.7 of the audit.

Improving performance

Key challenges have not been addressed

- **3.62** An important element of the "Plan-Do-Check-Improve" management model is taking action on the basis of performance information to address identified weaknesses and close performance gaps.
- 3.63 Environment Canada has made a number of important improvements to the organization and administration of the enforcement program. For example, the Department created an independent Environmental Enforcement Directorate, managed nationally under a Chief Enforcement Officer who reports directly to the Deputy Head of the Department. This structure is intended to improve the governance of the program. The Directorate is also in the process of finalizing its manual, which is intended to provide enforcement officers and management with a comprehensive set of operating procedures, policies, and controls to help ensure that the

Act and its regulations are enforced in a fair, predictable, and consistent manner.

- **3.64** Despite these improvements, we found that the Department has yet to address some significant shortcomings, such as
 - regulations that are difficult to enforce,
 - inadequate intelligence information to inform enforcement planning and targeting, and
 - inadequate training to support enforcement officers.
- 3.65 Two of these shortcomings were identified over a decade ago. The May 1998 report of the Parliamentary Standing Committee on Environment and Sustainable Development identified a need to rewrite regulations to ensure that they are enforceable. It also identified the lack of a comprehensive intelligence gathering and analysis capacity at Environment Canada.
- **3.66** Action on the enforceability of regulations. In 2010, the enforcement program completed a two-year review of the enforceability of CEPA 1999 regulations. We view this as a positive development. It found that 41 percent of the regulations have sufficient weaknesses to affect enforcement. These weaknesses include
 - a lack of clear or prescriptive language,
 - problematic definitions,
 - absent or problematic testing or laboratory methods,
 - an unreasonable burden of proof,
 - significant operational challenges to verify compliance, and
 - an omission of a significant section or general prohibition.

For example, according to the review, the tetrachloroethylene regulations, which came into force in 2003 to control the use of this toxic substance by the dry cleaning industry, contain a significant omission. As a result of this omission, the review found that enforcement officers do not have any enforcement measure at their disposal to stop or prevent a dry cleaner from disposing of tetrachloroethylene down a drain or in the garbage, or allowing the release of this toxic substance from a leaking dry-cleaning machine.

3.67 At the end of our examination period, management told us that a resolution had been identified for over half of the weaknesses that affect enforcement and that the Department was developing a multi-year plan to address them. However, no amendments to these

Intelligence information—Intelligence is analyzed information that is used to identify risks and threats to enable decision makers to make informed, effective choices that counter those risks. It provides the user with knowledge that affords an opportunity to identify and manage the risk of an undesirable outcome.

regulations have yet been made. The Department informed us that it takes two to three years for the Department to process a regulatory amendment and as such, the majority of amendments will be made in 2012 or later.

- **3.68** Action on intelligence information. According to the Enforcement Branch, the role of the intelligence function is to
 - provide knowledge of events likely to occur by identifying risks;
 - enhance information on files, projects, and operations;
 - · assist in determining enforcement priorities; and
 - provide managers with information to allocate their enforcement resources.
- 3.69 While Department officials acknowledge that intelligence is critical to supporting enforcement operations and is key to the success of the Environmental Enforcement Directorate, clear expectations, policies, procedures, training, and accountabilities for the intelligence function have yet to be developed. Turnover in the Directorate's intelligence area has also been significant: according to the Directorate, over the last three years there have been four managers.
- **3.70** Action on training. As discussed in paragraph 3.41, the lack of regulation-specific training for enforcement officers remains a major impediment to enforcing many CEPA regulations.
- **3.71 Recommendation.** Environment Canada should ensure that regulations under the *Canadian Environmental Protection Act*, 1999 are written in a way that facilitates enforcement. Before regulations are brought into force, the Department should ensure that the appropriate training, analytical methods, and laboratory tests required to enforce the regulations are in place.
- The Department's response. Agreed. Environment Canada strongly affirms the importance of regulations being written in a way that facilitates enforcement. This is already a key and ongoing objective of the Department, and Environment Canada works hard to achieve it.

Work to address existing enforceability gaps is tailored to the risk imposed by the gap. Most of the enforceability gaps identified by the internal departmental study, referenced in the audit, relate to limitations in monitoring or reporting activities that hinder enforcement efforts but do not lead to environmental risks. In the few instances where this is not the case, the Department has been fast tracking relevant action to address the identified issues.

The Department has also strengthened its regulatory development processes to prevent the occurrence of future enforcement gaps. Environment Canada's existing Quality Management Systems (QMS) process for developing regulations requires that the Chief Enforcement Officer review the enforceability of proposed regulations. To strengthen the QMS process, Environment Canada has introduced an integrated departmental approach to regulation design, ensuring that Enforcement Branch and Science and Technology Branch have an early and ongoing role in regulatory development. This will enable consideration of key factors such as analytical methods, laboratory procedures, and training that are fundamental to enforcement at the design phase. In addition, in 2011–12, Environment Canada has developed five CEPA regulations training courses to address current training-related gaps.

The Department does not agree with the report's findings that dry cleaning regulations represent an enforcement gap that will lead to environmental risks. An enforceability gap exists where a regulation purports to control an issue, but a provision of the regulation cannot be enforced because of legal language or reference to an unusable test method. This is not the case in the dry cleaning example illustrated in the report.

Conclusion

- 3.72 Environment Canada has made a number of important improvements to the organization and administration of the enforcement program. These improvements include centralizing the management of the program under the direction of a Chief Enforcement Officer; establishing a methodical, risk-based enforcement planning process for determining enforcement priorities; and identifying aspects of the enforcement program that need improvement. Environment Canada has also developed an enforcement policy and management controls intended to ensure that enforcement officers apply the Act in a fair, predictable, and consistent manner across its regional offices.
- 3.73 However, the Environmental Enforcement Directorate does not have adequate information on whom it is regulating and who is not complying with the *Canadian Environmental Protection Act*, 1999 (CEPA 1999) regulations. This information is needed to determine which regulatees and activities pose the greatest risks to human health or the environment as a result of non-compliance. Without a clear understanding of whom it is regulating and which regulatees pose the

25

greatest threats, the Directorate cannot be sure that its National Enforcement Plan is targeting the highest risks to human health and the environment.

- 3.74 In addition, in many cases we found no evidence that the Directorate had applied key management controls intended to ensure that enforcement officers carry out their enforcement activities in a fair, predictable, and consistent manner as the Act and the enforcement policy require or that enforcement officers followed up on their enforcement actions to verify whether violators returned to compliance.
- 3.75 The Department does not know the extent to which its enforcement activities are improving compliance or minimizing environmental damage and threats to Canadians. In addition, Environment Canada has been slow to address significant shortcomings such as inadequate training and inadequate gathering and analysis of information to inform enforcement planning and targeting.
- 3.76 As a result, we concluded that the enforcement program was not well managed to adequately enforce compliance with the *Canadian Environmental Protection Act*, 1999 and ensure that threats to Canadians and their environment from pollution are minimized.

About the Department's response

The Office's professional practices require auditors to seek management's acknowledgment of the factual accuracy of audit reports.

Several months prior to finalizing an audit report, we provide management with draft copies of the report and with briefings to review and validate the audit findings and conclusions.

Several meetings were held with senior management at Environment Canada to review the audit findings and conclusions and to obtain acknowledgement of the facts presented in this report. Although no new facts or evidence were presented by management that would have led us to alter the findings and the conclusion, management has refused to acknowledge the facts presented in this report.

On 25 October 2011, the Deputy Minister of Environment Canada provided the following response to our report:

"The Department rejects the contention that the issues are of such a magnitude to justify a comprehensive conclusion that the enforcement program was not well managed to adequately enforce compliance with CEPA. In particular, Environment Canada disagrees with the audit's contention that the issues identified

prevent the Department from planning its enforcement activities to effectively target the highest risks to human health and the environment, or prevent the Department from enforcing CEPA 1999 in a fair, predictable and consistent manner. Based on these considerations, we cannot accept either the findings or the conclusions of the audit. Nevertheless, although the Department does not accept the enforcement audit findings or conclusions, we accept the recommendations that the audit draft contains."

Based on the combined effect of multiple concerns about management practices noted in this audit report, we are of the view that the findings and conclusion we have presented are fair and appropriate.

About the Audit

All of the audit work in this chapter was conducted in accordance with the standards for assurance engagements set by The Canadian Institute of Chartered Accountants. While the Office adopts these standards as the minimum requirement for our audits, we also draw upon the standards and practices of other disciplines.

Objective

The objective of this audit was to determine whether Environment Canada adequately enforced compliance with the Canadian Environmental Protection Act, 1999.

Scope and approach

The audit focused on Environment Canada's enforcement of the Canadian Environmental Protection Act, 1999 managed by the Environmental Enforcement Directorate. The audit examined the Directorate's risk-based management according to the "Plan-Do-Check-Improve" management model.

During our audit, we interviewed officials at Environment Canada, including staff in three of the environmental enforcement program's five regional offices. The main objective of the interviews was to identify documentation relevant to the audit. Our audit approach also included reviewing files from the Department's enforcement database, NEMISIS. We examined a representative sample of enforcement files from the fiscal years 2006–07 to 2009–10 to determine whether the Department had complied with its Compliance and Enforcement Policy for CEPA 1999 to follow up with violators to verify that they had returned to compliance. In addition, we reviewed representative samples of enforcement files from the fiscal years 2007–08 to 2010–11 to determine whether the Department had applied key management controls to ensure that enforcement actions are applied in a fair, predictable, and consistent manner. These representative samples allowed us to conclude on the sampled populations with a confidence level of 90 percent and a margin of error of +10 percent.

Criteria

To determine whether Environment Canada adequately enforced compliance with the Canadian Environmental Protection Act, 1999, we used the following criteria:			
Criteria	Sources		
Environment Canada applies a risk-based approach to plan its enforcement program.	Compliance and Enforcement Policy for the Canadian Environmental Protection Act, 1999 (CEPA 1999), Environment Canada, 2001		
	Framework for the Management of Risk, Treasury Board, 2010		
	Integrated Risk Management Implementation Guide, Treasury Board of Canada Secretariat, 2004		
	Cabinet Directive on Streamlining Regulation, Government of Canada, 2007		
Environment Canada implements its enforcement program to enforce compliance with CEPA 1999 in a fair, predictable, and consistent manner.	Canadian Environmental Protection Act, 1999		
	Compliance and Enforcement Policy for CEPA 1999, Environment Canada, 2001		
Environment Canada periodically assesses the adequacy of its enforcement program and identifies opportunities for improvement.	Framework for the Management of Risk, Treasury Board, 2010		
	Integrated Risk Management Implementation Guide, Treasury Board of Canada Secretariat, 2004		
	Cabinet Directive on Streamlining Regulation, Government of Canada, 2007		
	Ensuring Environmental Compliance: Trends and Good Practices, Organisation for Economic Co-operation and Development, 2009		
	 Principles of Environmental Compliance and Enforcement Handbook, International Network for Environmental Compliance and Enforcement, April 2009 		
Environment Canada takes corrective action on identified opportunities to improve the performance of its enforcement	Framework for the Management of Risk, Treasury Board, 2010		
program.	 Integrated Risk Management Implementation Guide, Treasury Board of Canada Secretariat, 2004 		
	Cabinet Directive on Streamlining Regulation, Government of Canada, 2007		

Management reviewed and accepted the suitability of the criteria used in the audit.

Period covered by the audit

The audit covered the fiscal years from 2006–07 to 2010–11. This period was chosen because we considered this time frame to be sufficient for examining the "Plan-Do-Check-Improve" management cycle.

Our audit work for enforcement planning and measuring performance focused on the most recent planning and reporting cycle, while our audit work related to implementing enforcement plans and taking action on areas identified for improvement covered four years to allow the Department the opportunity to follow up with violators and take corrective action on identified opportunities for improvement.

Audit work for this chapter was completed on 11 October 2011.

Audit team

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Appendix List of recommendations

The following is a list of recommendations found in Chapter 3. The number in front of the recommendation indicates the paragraph number where it appears in the chapter. The numbers in parentheses indicate-the paragraph numbers where the topic is discussed.

Recommendation

Response

Risk-based planning

3.38 The Environmental Enforcement Directorate should put in place procedures to help identify regulatees and reduce uncertainty about specifically whom it is regulating under each regulation that has an enforcement component. (3.22–3.37)

Agreed. Environment Canada acknowledges that in some cases it would be beneficial to establish procedures to systematically maintain accurate and up-to-date lists of the regulated parties. It is important to emphasize, however, that it is neither necessary nor feasible to always maintain a comprehensive list of all regulated parties. For example, regulated communities are not always completely inventoried for new regulations. The departmental approach is to progressively build knowledge of the regulated community by targeting larger companies first and then further identifying smaller and more dispersed ones. This incremental approach has proven to be a cost-effective method to identify regulatees for compliance promotion and enforcement purposes.

The Department does not agree with the report's conclusion that key information on regulatees is missing and that, as a result, the Department's ability to target its enforcement activity to highest risk offenders is hindered. Environment Canada's existing practices maintain an appropriate level of information on its regulated communities drawn from a number of sources which varies depending on the nature of the regulation.

The Department will continue to improve its processes for updating relevant information about regulatees on a regular and consistent basis as part of the updating of Compliance Strategies and the annual Compliance Priority Planning Process.

Recommendation

3.39 The Environmental Enforcement Directorate should obtain and analyze information on compliance issues and trends to establish priorities in its National Enforcement Plan and ensure that it is targeting its enforcement resources toward the individuals, companies, and government agencies that pose the greatest threats to the environment and human health. (3.22–3.37)

Response

Agreed. The Department employs a rigorous risk-based approach to enforcement planning, where threats and risks to the environment and human health are factors in priority decision making, as was noted in the audit. Priority setting for the enforcement of the Canadian Environmental Protection Act, 1999 draws on knowledge and expertise at both the national and regional levels. Once national priorities for compliance verification have been established, regions undertake local targeting, where compliance histories are considered by operational managers and inspectors in developing local plans.

Environment Canada agrees, however, that the CEPA enforcement planning process could benefit from information drawn from a more systematic approach to compliance trends analysis where feasible.

In order to further improve the existing national risk-based CEPA enforcement planning process, where it is feasible, practical, and beneficial, Environment Canada will analyze existing compliance information and will produce sectoral compliance rate statistics for selected sectors to aid in priority setting and track compliance results over time.

Enforcing the Act

3.50 The Environmental Enforcement Directorate should apply its key controls to ensure that enforcement actions are conducted in a manner that is fair, predictable, and consistent across its five regional offices in accordance with CEPA 1999. (3.43–3.49)

Agreed. The Environmental Enforcement Directorate agrees that the management controls identified in the audit, data entry and record keeping for enforcement actions need to be improved and will ensure that they conform to its Internal Decision Making Process, with a particular emphasis on better documenting management approvals of enforcement actions by Winter 2012.

The Department does not agree that weaknesses in these management controls affect its ability to ensure the fair, predictable and consistent enforcement of CEPA. There are legal, structural and programmatic checks and approvals within the CEPA framework in addition to the management controls examined in the audit that ensure fairness and consistency. Officers receive training on the use of tools such as Environmental Protection Compliance Orders (EPCO): prior to the issuance of an EPCO, officers serve a Notice of Intent, providing the regulatee an opportunity to make representations; the Department of Justice assists in the drafting of the order to

Recommendation	Response	
	ensure measures chosen are appropriate and supportable in law;	
	and, regulatees may appeal an order to an independent quasi-	
	judicial authority, the CEPA Chief Review Officer (CRO).	
	Between 2006–07 to 2010–11, 107 EPCOs were issued. Only 3	
	were appealed to the CRO. Two were upheld, with the third	
	CRO ruling in favour of the regulatee. The Crown appealed that	
	ruling to Federal Court, where the original EPCO was upheld	

whole is functioning well.

Measuring performance

3.60 The Environmental Enforcement Directorate should establish performance standards for following up with violators to verify that they return to compliance within the shortest time possible and with no further violation of the Act. (3.53–3.59)

3.61 The Environmental Enforcement Directorate should assess the contribution of its enforcement activities to regulatory compliance as a basis for enforcement planning and continual improvements to the enforcement program. (3.53–3.59)

Agreed. The Environmental Enforcement Directorate will establish standards for compliance verification in response to all enforcement actions resulting from non-administrative violations by Winter 2011–12. It is important to distinguish, however, between the treatment of different classes of violations and the enforcement actions chosen to deal with each. Where an officer has issued an EPCO, legally binding timelines for a return to compliance are established and schedules are monitored closely. Where a warning letter is issued for a one-time minor release and where the regulatee promptly reports and takes measures to stop and permanently fix the deficiency at the time of the release, follow-up verification is not necessary nor is it an effective deployment of resources. Follow-up for administrative violations will continue to be dealt with on a case-by-case basis, where factors such as potential environmental or human heath risks and the regulatee's compliance history will be considered.

and reinstated. The findings demonstrate that the system as a

Agreed. Environment Canada will conduct a pilot project over 2011–13 to calculate sectoral compliance rate statistics for selected sectors, where feasible, and analyze resultant compliance trends in light of enforcement and compliance promotion actions. The pilot project will determine the feasibility of any broader application.

The Department will also continue to use and refine information about environmental risks to inform the planning of its enforcement activity. However, measuring absolute environmental outcomes and the contribution of specific activities to those outcomes remains a difficult methodological challenge for organizations around the world, including Environment Canada, as reflected by the primarily output measures identified in Exhibit 3.7 of the audit.

Recommendation

Response

Improving performance

3.71 Environment Canada should ensure that regulations under the Canadian Environmental Protection Act, 1999 are written in a way that facilitates enforcement. Before regulations are brought into force, the Department should ensure that the appropriate training, analytical methods, and laboratory tests required to enforce the regulations are in place. (3.40–3.42, 3.62–3.70)

Agreed. Environment Canada strongly affirms the importance of regulations being written in a way that facilitates enforcement. This is already a key and ongoing objective of the Department, and Environment Canada works hard to achieve it.

Work to address existing enforceability gaps is tailored to the risk imposed by the gap. Most of the enforceability gaps identified by the internal departmental study, referenced in the audit, relate to limitations in monitoring or reporting activities that hinder enforcement efforts but do not lead to environmental risks. In the few instances where this is not the case, the Department has been fast tracking relevant action to address the identified issues

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Report of the Commissioner of the Environment and Sustainable Development—December 2011

The Commissioner's Perspective

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Chapter 6 Environmental Petitions







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2011



Report of the
Commissioner of the
Environment and
Sustainable Development

DECEMBER

Chapter 4

A Study of Managing Fisheries for Sustainability



Office of the Auditor General of Canada



2011



Report of the
Commissioner of the
Environment and
Sustainable Development

DECEMBER

Chapter 4
A Study of Managing Fisheries for Sustainability





The December 2011 Report of the Commissioner of the Environment and Sustainable Development comprises

The Commissioner's Perspective, Main Points—Chapters 1 to 5, an appendix, and six chapters. The main table of contents for the Report is found at the end of this publication.

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Chapter

4

A Study of Managing Fisheries for Sustainability



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A Study of Managing Fisheries for Sustainability

Main Points

What we examined

The federal government is responsible for managing seacoast and inland fisheries on behalf of all Canadians and for ensuring that these activities are conducted in a sustainable manner.

Based on principles of sustainable development that are generally accepted internationally, a sustainable fishery would support the current needs of society and of individuals engaged in the fishery and would be managed with a view to protecting the resource for future generations.

We conducted this study to identify the challenges of operating fisheries in a sustainable way; the key properties of sustainable fisheries; and the principles, responsibilities, and management practices involved in managing fisheries sustainably. We focused on marine fisheries, which in Canada include First Nations, commercial, and recreational users.

This document is not an audit report. For this reason, our observations should not be seen as an assessment of the federal government's current fisheries practices or performance. This study is a step toward identifying a framework and criteria for our future audits to determine whether fisheries management practices are supporting sustainable fisheries.

Why it's important

Fisheries account for about 15 percent of the animal protein directly consumed by humans, and the demand for fish is expected to grow. In 2010, however, the Food and Agriculture Organization (FAO) of the United Nations reported that 32 percent of fish stocks worldwide were overexploited, depleted, or recovering.

In Canada, fisheries contribute to the national and coastal economies, but they are also under pressure. Some major fish stocks have declined substantially in recent years, with dramatic economic and social consequences. Because of the complexity of marine ecosystems, it can be challenging to manage human activities against a backdrop of natural variability.

Organizations that manage fisheries have a difficult job. They oversee and regulate the harvesting of fish in the context of significant uncertainty. They need to make decisions so that fish will be available in the future to provide the food and jobs on which many people rely.

What we found

- A sustainable fishery helps sustain fish stocks, markets, fishers, and, in some cases, communities. The long-term sustainability of a fishery depends, in part, on respecting ecological limits identified through the use of reliable scientific information. Respecting these limits requires taking into account the ecosystems on which fish survival depends and uncertainties about how the ecosystem will change.
- One element of a sustainable fishery is a framework of clear roles and responsibilities that is appropriate to the size and importance of the fishery. The FAO and others have concluded that fisheries are at greatest risk when such a clear framework does not exist. An effective framework of clear roles and responsibilities built on accountability and transparency can reduce the risk that fishing activity will endanger the long-term ecological sustainability of fish stocks.
- Every fishery includes many stakeholders. Within the necessary framework, management practices to help achieve a sustainable fishery include establishing and clearly communicating the social, economic, and ecological objectives for the fishery in order to guide the decisions and conduct of all those involved in it. Sound management practices also entail developing, implementing, and evaluating fishery plans aimed at sustainability, but they provide no guarantee of future harvests.

Introduction

- 4.1 Recent experience, in Canada and elsewhere in the world, has shown that the ability of fisheries to meet future human needs cannot be taken for granted. In 2010, the Food and Agriculture Organization of the United Nations (the FAO) reported that 32 percent of fish stocks worldwide were overexploited, depleted, or recovering, compared to 10 percent in 1974. This situation threatens the incomes and food supply of people around the world. In 2008, the World Bank and the FAO estimated that the world economy could gain roughly \$50 billion (US dollars) each year through improved management of fisheries.
- 4.2 In Canada, some major fish stocks have declined greatly in recent years. During the 1990s, most of Atlantic Canada's commercial groundfish fishery collapsed. The stocks fell to historic lows and have yet to recover, even though fishing has been severely limited (Exhibit 4.1). In April 2010, the Committee on the Status of Endangered Wildlife in Canada classified the four Atlantic cod populations as endangered. On the Pacific coast, the 2010 sockeye salmon run in the Fraser River was among the highest ever recorded, yet it followed dramatic declines in preceding years (Exhibit 4.2). It is not yet clear whether the 2011 run will revert to the previous declining trend.
- 4.3 These changes in harvest levels result from underlying changes in complex marine ecosystems combined with the impact of human activities. However, it has proved to be difficult to separate the roles of different factors, such as water temperature, availability of prey fish, long-term population cycles, and fishing activity. For example, Fisheries and Oceans Canada has recently focused its attention on the role of grey seals, which eat groundfish, in hampering the recovery of groundfish stocks in eastern Canada.
- 4.4 Beyond the ecological effects, changes in harvest levels can have profound economic and social consequences, especially in coastal communities and in First Nations that depend on the use of fish in their culture. In Atlantic Canada, the increase in shellfish harvests has in part replaced the groundfish losses, but questions are now being raised about how sustainable these shellfish fisheries are. Governments have had to pay high costs when the drops in fishery harvests were extreme. At the time of the groundfish collapse, Canada spent more than \$3 billion over seven years on income support and adjustment programs for Canadians whose livelihoods were hurt by the collapse.

Fishery

A fishery is an activity leading to harvesting of fish. It may involve capture of wild fish or raising of fish through aquaculture.

Source: Food and Agriculture Organization

Groundfish

Groundfish are those species that are usually caught near the ocean bottom, including cod, haddock, pollock, redfish, halibut, flounder, and others.

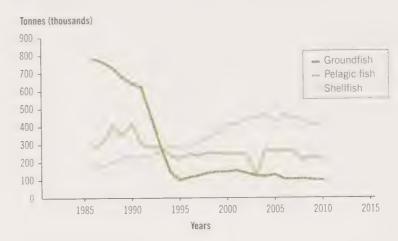
Pelagic fish

Pelagic fish live in midwater or close to the surface, and include salmon, herring, capelin swordfish, tuna, and others.

Shellfish

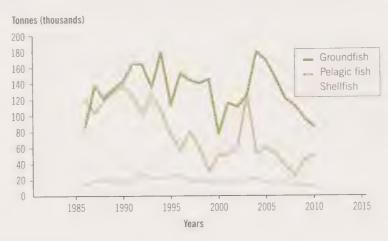
Shellfish include molluscs, such as oysters, and crustaceans, such as crab, shrimp, and lobster

Exhibit 4.1 Commercial harvests of some major Atlantic Canadian fish stocks have declined since 1986



Note: Data for 2010 is preliminary Source: Fisheries and Oceans Canada

Exhibit 4.2 Commercial harvests of some major Pacific Canadian fish stocks have declined since 1986



Note: Data for 2010 is preliminary Source: Fisheries and Oceans Canada

4.5 Overall, in 2009 the fishing sector in Canada landed fish worth about \$1.6 billion—a number that has been fairly constant over the last few years. The resulting export income was about \$3.6 billion in the same year. Around 52,000 people were employed in harvesting fish in 2008, with another 28,000 people working in the fish processing industry.

4.6 Given that there can be significant fluctuations in some stocks and that there are risks that stocks could decline in the future, governments, fisheries managers, and other stakeholders need to put in place the governance arrangements (who is responsible for what) and management practices (how things are done) that will support the long-term sustainability of fisheries. Such arrangements and practices do not guarantee that fisheries will keep generating economic benefits indefinitely or that catches will be sustained at the desired levels, but do help create the conditions for sustainability over the long term.

Focus of the study

- 4.7 This study identifies the key properties of sustainable fisheries based on internationally accepted principles and experience, with an emphasis on the principles and lessons that would apply to Canada. We focused on the governance arrangements and management practices that support sustainable fisheries. We did not address inland fisheries or aquaculture but concentrated on marine fisheries, which in Canada include First Nations, commercial, and recreational users. This study is a step toward identifying a framework and criteria for our future audits to determine whether fisheries management practices are supporting sustainable fisheries. In this study, we refer to both fisheries managers working directly with fishers and to governments and senior officials providing strategic and policy direction.
- 4.8 This document is not an audit report. For this reason, our observations should not be seen as an assessment of the current practices used by the federal government to manage fisheries or of its performance. Rather, we have identified some questions that Parliament may wish to consider given its roles of setting the legislative framework for managing fisheries and overseeing the activities of federal departments and agencies.
- **4.9** More details on the objectives, scope, and approach are in **About the Study** at the end of this chapter.

Fisheries management

The integrated process of information gathering, analysis, planning, decision making, allocation of resources, and formulation and enforcement of fishery regulations by which the fisheries management authority controls the present and future behaviours of the interested parties in the fishery, in order to ensure the continued productivity of the living resources.

Source: Adapted from Food and Agriculture Organization

Observations

What are the sustainability challenges for fisheries?

4.10 The state of the world's fish stocks has highlighted the major environmental, economic, social, and organizational challenges that both governments and fisheries managers face when they seek to create the conditions for a sustainable fishery (Exhibit 4.3). Some of these challenges have been present since governments began to actively manage fisheries; others have emerged much more recently. Some challenges will cause problems that those responsible for managing fisheries must respond to; other challenges will create opportunities.

Exhibit 4.3 A sustainable fishery is defined in relation to current and future needs

The Canadian Federal Sustainable Development Act defines sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their needs." This point leads to the question of how to define a sustainable fishery. The Food and Agriculture Organization has defined it in terms of "fishing activities that do not cause or lead to undesirable changes in the biological and economic productivity, biological diversity, or ecosystem structure and functioning from one human generation to the next." This and other similar definitions refer to the principles of sustainable development and how fisheries contribute to it. These concepts may also be expressed as follows:

- fisheries that support the current needs of people—those engaged in the fishery and society as a whole; and
- fisheries conducted in a manner that protects the interest of future generations.

In sum, a sustainable fishery helps sustain fish stocks, markets, fishers, and, in some cases, communities. This definition does not necessarily imply that there will be constant and stable levels of any of these elements.

- 4.11 Environmental challenges. Marine ecosystems display long-term trends and short-term fluctuations in a fluid three-dimensional environment. The changes in the physical aspects, such as temperature, and the biological aspects, such as species competing for the same food supply, mean that many influences on the number of fish available in a given year are outside of human control, and cannot be managed. For example, recent work by scientists at Fisheries and Oceans Canada suggests that snow crab populations go through a regular cycle every decade or so. As a result, fisheries managers may need to adjust the factors they can control—mainly fishing activity—as the ecosystem changes.
- **4.12** The vast expanses of oceans, the natural variation in fish populations, and the physical limits to understanding how marine ecosystems function mean that there will always be gaps in the

knowledge of fish stocks and how they fit into their ecosystems. The result of these limitations on scientific knowledge may be that some stocks are being harvested beyond the ecological limits, while other stocks might withstand higher harvests. The recent Census of Marine Life, led by an international group of scientists, made a major contribution to the understanding of fish stocks and where they migrate, but it also revealed scientists' lack of knowledge about many aspects of ocean ecology.

- Targeted fish may be subject to overfishing; however, other fish and other species caught unintentionally (bycatch) or those indirectly affected by certain fishing methods may also suffer, for example, as a result of pulling fishing nets along the sea floor in sensitive areas. In some settings, these factors may greatly affect fish populations. For example, a recent audit of fisheries management in the Netherlands estimated that the bycatch was 57 percent of the total weight of fish caught. A 2011 report by the International Programme on the State of the Ocean concluded that overfishing and habitat loss were the main causes of biodiversity loss for marine ecosystems.
- 4.14 Fish stocks vary depending on naturally occurring conditions in marine ecosystems and in the linked rivers and estuaries. Studies now point to climate change as driving physical and biochemical shifts in the ocean environment at the global scale. The ocean is rising and, overall, is becoming warmer and more acidic. While some stocks may benefit from warmer water, these shifts may threaten the ecological viability of other stocks and may make it more difficult to estimate fish populations. The past is becoming a less reliable predictor of the future, which raises questions about estimates based solely on historical data and past trends.
- Fish stocks may also be harmed by other human activities that take place in the ocean, such as offshore oil and gas exploitation. Activities on land have also degraded fish stocks through, for example, runoff of sediment from agricultural land. Those responsible for managing fisheries need to try to understand how fish stocks will be affected by such activities and recognize the cumulative pressures on the stocks that they manage.
- In contrast, measures to protect endangered marine species may have positive impacts on commercial fish stocks. Fisheries and Oceans Canada has recommended that 96 aquatic species be classified as being at risk. They now are listed as such under the Species at Risk Act. An arm's-length advisory committee has identified a further 88 aquatic species as being at risk, but they have either not been listed or a listing

decision has not yet been made. In the cases where conservation measures have been put in place to protect such endangered species, species linked to them in the ecosystem may also benefit.

- 4.17 In Canada and in other countries, the creation of marine protected areas has received much attention lately. Research is under way to understand the effects of such areas on commercially harvested fish stocks. Studies have already shown the benefits of such protected areas for stocks that do not migrate long distances, such as shellfish.
- 4.18 Economic challenges. Those responsible for managing the fisheries must also take account of the economic aspects of the industries they are trying to manage. Some industries operate globally and market their products around the world. As a result, they may be affected by international economic trends and events that include increases in the price of fuel, the impact of foreign exchange rates on export markets, offshore oil spills in other countries, the increase in people's consumption of fish protein, and the increase of aquaculture production as a source of fish that competes with the wild fishery. In particular, the economic context for fisheries is shifting as a result of the global interest in eco-certification (Exhibit 4.4).

Exhibit 4.4 Eco-certification of fisheries products creates new challenges for fishers and fisheries management

Concerns about the state of the marine environment have led consumers, retailers, and export markets to demand evidence that fish products are legally caught and are derived from environmentally sustainable fisheries. Market-based initiatives, such as eco-certification, where third parties assess sustainability for fish products, as well as demands from other countries that products be traceable, are having an impact on fishers and fisheries management. More and more often, major seafood buyers and retailers in Europe, the United States, Canada, and elsewhere are asking for proof that products come from sustainable fisheries.



The northern prawn fishery in the Gulf of St. Lawrence is certified by the Marine Stewardship Council.

Major policy choices must be taken to respond to these new market realities. Certification has become a basic requirement for maintaining access in some markets, but the process may be expensive for fisheries managers and for fishers, both for the initial assessment and when maintaining certification. The Marine Stewardship Council, the leading organization offering this service, has certified 18 Canadian fisheries out of a total of 130 worldwide. Several others are being assessed.

Sources: Marine Stewardship Council and Fisheries and Oceans Canada

- 4.19 Governments and others responsible for managing fisheries have only a limited ability to control some of these economic forces. In Canada and in many other countries, fisheries managers have tried to reduce the capacity of national fishing fleets, seeking to bring fishing effort into line with the ability of the stocks to sustain the harvest. These approaches include economic incentives and schemes for governments to buy excess boats. Results, however, have been mixed. In some countries, financial subsidies have been one of the factors contributing to overcapacity: for example, in the form of fuel subsidies for fishing boats. Today, governments, including Canada, are applying other policy tools to encourage fishers to self-adjust as resources and economies fluctuate.
- 4.20 Governments may also make choices about the type and extent of financial support for different groups in the fishing sector. Managers may intervene in fisheries to promote or respond to new technologies. For example, better techniques for locating fish may increase the pressure on fish stocks because the existing boats will operate more efficiently. The effect may be similar to adding more fishing boats to the fleet.
- 4.21 Social challenges. Every fishery includes many stakeholders. While fisheries management is sometimes defined only in terms of managing a biological resource, it also has indirect effects on the processing industries that handle the products and on the coastal communities where the fishers and their families live. Because these communities rely socially and economically on fishing incomes, ministers may feel political pressure to increase harvest quotas, even when the stocks may be at risk. Or, communities may seek to have more of a say in how the fishery is managed or how access to the resource is distributed. Officials also need to work with those responsible for social policies, such as employment policies, to make sure that the overall government policy direction is coherent and consistent.
- 4.22 Because of the political and legal implications, one of the most difficult social challenges is allocating access to fish stocks. In Canada, as a result of the Constitution Act, 1867, the federal government has exclusive legislative authority for seacoast and inland fisheries. In tidal waters, in general, Parliament has exclusive jurisdiction over all aspects of fisheries management. Canada's fisheries are a common property resource to be managed for the benefit of all Canadians. As a result, the federal government must place limits on access to prevent overexploitation. The government must also decide how the access will be divided among the various stakeholders who have claims on the

resources. This means understanding the traditional uses of marine resources and where the potential conflicts are among different uses. In making decisions about these issues, the government must take account of principles of equity and constitutionally protected rights, such as the Supreme Court ruling that allowed some Atlantic fisheries to be used by Mi'kmaq and Maliseet First Nations.

- 4.23 Giving fishers or communities access to resources and allowing those access privileges to be traded can help to reduce overfishing. This approach may also motivate fishers to better manage their investments in boats and equipment, aligning fishing capacity with the health of the fish stocks. Long-term and stable access to the resource may help create a more stable business environment for fishers and may also encourage better stewardship of resources. Fishers with secure access to the fishery may adopt a culture of compliance and self-enforcement, and may be more inclined to pay the costs of managing the fishery. Several countries, including Canada, Australia, New Zealand, and Iceland, have experimented with different approaches to providing access rights to fisheries.
- 4.24 Organizational challenges. Governments and fisheries managers have changed their practices and approaches over the decades in response to these environmental, economic, and social challenges. Fisheries management organizations have also evolved in the way they carry out four core functions.
- 4.25 The uncertain environment in which management decisions are made leads to the first core function: obtaining and using evidence to manage the fishery. Inadequate information may result in overexploitation of fish stocks, or could lead to missed opportunities for economic benefits. Senior managers need to decide what kinds of and how much scientific research is required; how it complements other sources of information, such as traditional knowledge or monitoring programs; and what research may be needed in the future. For example, shifting from a narrow focus on what is happening to a single fish stock to a broader focus on understanding the main ecological limits will greatly increase the demands on scientists and the need for them to work together.
- 4.26 The second core function is making decisions related to how the fishery will be operated. After ministers make the political and legal decisions about who is eligible to participate in a given fishery, fisheries managers need processes for deciding which fish will be caught, how many will be taken, by whom, where, when, and using what equipment. These decisions are among the most powerful tools

available to managers to influence the direction and sustainability of the fishery. Fisheries managers need to design organizations based on answers to the following questions: Who should make which decisions? What is the appropriate process? Who participates in the decision making? For example, managers may rely on the analysis and judgment of fisheries scientists and other evidence to estimate how many fish can be caught from a given population.

- 4.27 The third core function is ensuring that fishers comply with legal and policy requirements. Fishing is largely done far from land, which makes this activity difficult and costly to observe and manage. Researchers in the United Kingdom and Canada estimated that illegal, unreported, and unregulated catches accounted for between 11 and 25 percent of the total global catch in 2003, which shows that effective enforcement is crucial if a fishery is to be sustainable. The estimated proportions for Canadian fisheries were lower, but the researchers highlighted the difficulty of making reliable estimates.
- 4.28 The last core function is setting priorities and budgets to carry out the other functions effectively. Each of the other functions may involve major financial commitments. In the current Canadian federal context, for example, this situation creates a further challenge of setting budget priorities and managing with constrained resources. It also implies deciding in which situations other parties should bear the costs or users should pay.

What issues were observed in the past?

4.29 Over the last 14 years, the Office of the Auditor General has examined several aspects of fisheries management in Canada (Exhibit 4.5). We have reported several observations and recommendations related to the sustainability of fisheries. The key concerns we have noted in these past chapters include the following:

Environmental:

- a lack of progress on putting marine protected areas in place;
- declining health and quality of the marine environment, including, in some cases, declining harvests;
- the need to take a precautionary approach to harvest levels;

Economic:

 slow and ineffective management of overcapacity in the fishing fleet;

Governance arrangements:

- an unclear division of responsibilities with the provincial governments and with industry partners;
- missed opportunities to involve fishers in management decisions about the fishery resource;

Monitoring and enforcement:

- poor monitoring of fish habitat;
- gaps in monitoring, control, and surveillance;
- inadequate enforcement mechanisms;

Legislation and policy:

- legislation that is not consistent with current demands;
- unclear management objectives, without specific results being described;
- very slow progress on integrated ocean management, including managing the trade-offs between conflicting uses; and
- no clearly stated policy for sustainable fisheries.

Exhibit 4.5 The Office of the Auditor General has released several reports that examine how fisheries are managed

Year	Report title	
2009	Protecting Fish Habitat	
2005	Fisheries and Oceans Canada—Canada's Oceans Management Strategy	
2004	International Environmental Agreements	
2004	Fisheries and Oceans Canada—Salmon Stocks, Habitat, and Aquaculture	
2000	Fisheries and Oceans—The Effects of Salmon Farming in British Columbia on the Management of Wild Salmon Stocks	
1999	Fisheries and Oceans—Pacific Salmon: Sustainability of the Fisheries	
1999	Fisheries and Oceans—Managing Atlantic Shellfish in a Sustainable Manner	
1997	Fisheries and Oceans Canada—Pacific Salmon: Sustainability of the Resource Base	
1997	Fisheries and Oceans Canada—Sustainable Fisheries Framework: Atlantic Groundfish	
1997	Fisheries and Oceans Canada—Rationalization and Renewal: Atlantic Groundfish	

- **4.30** Parliamentary committees have endorsed many of our recommendations and have conducted their own investigations of several fisheries. External commissions have also examined fisheries management in Canada. The most recent one is the commission of inquiry into the decline of sockeye salmon in the Fraser River.
- 4.31 The federal government's approach to managing fisheries has evolved over these 14 years. For example, the government has released new policy statements for Atlantic fisheries and for wild salmon on the Pacific and Atlantic coasts, as well as other conservation policies under an umbrella Sustainable Fisheries Framework. In this study, we have not assessed the progress the federal government has made in response to our past findings and recommendations. Our past findings do, however, reinforce the practical challenges that fisheries managers in Canada have faced.

What are the principles for managing fisheries sustainably?

4.32 Based on our review of the literature, the key principles to help achieve a sustainable fishery fall into two related groups: effective governance arrangements and principles of good management. By a governance arrangement, we mean the legal and authority relationships among the parties, the responsibilities for decisions and action, and the mechanisms for accountability. Also, two specific principles deserve to be looked at in detail: the ecosystem approach and the precautionary approach. In our view, fisheries managers can apply these principles to both the long-standing challenges and the emerging issues.

Effective governance arrangements provide a foundation for sustainability

- 4.33 As we analyzed international guidance documents and other relevant sources, we found that to achieve a sustainable fishery, a governance framework that is appropriate to the size and importance of the fishery is essential. The Food and Agriculture Organization (the FAO) and others have concluded that fisheries are at greatest risk when governance is weak or absent. If governance arrangements are good, then preferred policy outcomes are more likely to be achieved. An effective governance framework can reduce the risk that fishing activity will endanger the long-term ecological sustainability of fish stocks.
- **4.34** Create international governance arrangements. For fisheries, governance arrangements are set at the international, national, and local levels. A complex system of legally binding and non–legally binding instruments has been put in place to govern and guide the

management and exploitation of marine resources internationally (Exhibit 4.6). Canada has adopted all relevant international agreements.

Exhibit 4.6 Canada has supported several international agreements and undertakings related to fisheries

Among other things, the international agreements or undertakings that Canada has signed or committed to provide for

- a framework for international oceans governance, which includes fisheries;
- the rights and responsibilities of nations for using the world's oceans, and guidelines for managing marine natural resources;
- an exclusive economic zone, extending 200 nautical miles from a nation's shores, within which states have exploitation rights for all natural resources;
- a new management approach to sustainable development of the oceans that integrates the views of different sectors and disciplines, and establishes marine protected areas;
- an expectation that nations manage their fish stocks sustainably;
- the obligation to use the ecosystem approach and the precautionary approach, including reference points and harvest decision rules, when managing fisheries;
- the maintenance or restoration of fish stocks to levels that can produce the maximum sustainable yield. For depleted stocks, achieving this goal should be an urgent matter and, where possible, should be achieved no later than 2015;
- the implementation of the 1995 FAO Code of Conduct for Responsible Fisheries, relevant international plans of action, and FAO technical guidelines; and
- the prevention of illegally caught fish from entering international markets.
- 4.35 Fisheries managers also need agreements to manage fish stocks that cross national boundaries. The United Nations Agreement on Straddling and Highly Migratory Fish Stocks sets out a framework for conserving and managing such stocks in high seas areas: that is, in areas outside of national jurisdiction. In Canada, Grand Banks groundfish stocks are examples of stocks that straddle the boundary of Canada's exclusive economic zone, while bluefin tuna is a stock that migrates through fisheries waters in Atlantic Canada (Exhibit 4.7). These stocks are regulated by regional fisheries management organizations (RFMOs), which bring together representatives of the different countries involved in the fisheries.
- 4.36 In many ways, the role of RFMOs is similar to the roles of the organizations in charge of national fisheries management, such as Fisheries and Oceans Canada. However, some differences in governance, such as how RFMOs make decisions, mean it is difficult for them to manage the stocks sustainably. In recent years, some academics and non-governmental environmental organizations have criticized the

Exhibit 4.7 Bluefin tuna migrate across the Atlantic Ocean

Note: Shaded ocean areas are the regions through which bluefin tuna migrate. Source: Food and Agriculture Organization

performance of RFMOs, pointing to governance and accountability issues and to the lack of adequate protection for the stocks that RFMOs manage. Critics have also noted the high percentage of stocks under RFMO management that are being depleted or overexploited.

4.37 Establish national governance arrangements. Within countries, legislation and policy create the direction, the governance relationships, and the principles for managing fisheries. Because the social, economic, and environmental factors affecting fisheries are complex and vary by location, fisheries management organizations in different countries do not apply an identical, uniform approach. However, according to the FAO, nations should include in their fisheries legislation the requirements from international agreements and the legislative framework to achieve the agreed upon objectives for fisheries.

4.38 In Canada, for example, the responsibility for seacoast fisheries rests with the federal government. It is charged with setting up the legal, social, and economic arrangements used to manage fisheries within Canada's exclusive economic zone, such as how rights to use the fishery are allocated and how decisions are to be made and entorced. These arrangements include the roles of fisheries management organizations at the federal, provincial, and territorial levels, and the division of responsibilities in co-management relationships.

Co-management

A process of management in which government have power with resource users, with each given specific rights and responsibilities relating to information and decision-making.

Source. Organisation for Economic Co-operation and Development

- **4.39** Establish clear lines of accountability. Based on earlier work, our Office concluded that five essential elements underlie any type of accountability relationship:
 - clear roles and responsibilities,
 - clear performance expectations,
 - · expectations balanced with capacity,
 - · credible reporting, and
 - reasonable adjustment and review.
- 4.40 In Canada, the Minister of Fisheries and Oceans and the federal government are legally responsible and politically accountable for marine fisheries, answering questions about stewardship of these resources within the Parliament of Canada. Many people are involved in guiding and supporting fisheries management: senior managers, fisheries managers, scientists, and enforcement officials. As stakeholders become more involved, or when resources are co-managed, others outside of government share in governing the fishery. Fishers may also be held individually and collectively accountable through the allocation of rights and through monitoring, control, and surveillance activities.
- **4.41** Open and well-documented decisions can also help in terms of promoting acceptance and compliance, especially in an environment of uncertainty and when trade-offs need to be made. In our December 2002 Report, we spoke about transparency:

Transparency is essential to accountability, making it easier for those outside government to monitor and challenge the government's performance for consistency with policy intentions, for fairness, for propriety, and for good stewardship. The prospect of scrutiny also helps keep Ministers and managers of public programs (public servants as well as their partners in program delivery) attuned to the defensibility of their actions.

4.42 In the end, fishery resources are managed on behalf of all Canadians. Therefore, even though arranging accountability for the fishery is complex, Canadians have the right to know how well fisheries are being managed.

Good practices can strengthen fisheries management

- **4.43** Flowing from the governance framework that spells out who is responsible for what, the management practices describe how things are done. One widely used way of organizing management practices is the "plan-do-check-improve" cycle. We have highlighted a few key practices.
- 4.44 Set clear, long-term objectives. Fisheries managers set policies and objectives based on the social, economic, and environmental issues that fisheries face. Broad objectives or long-term policy goals that cut across several fisheries can be broken down into the operational objectives that can then guide all who are involved in each individual fishery. These objectives need to be defined and communicated clearly. In the United States, managers have set operational objectives for each of the 88 stocks that were overfished or subject to overfishing in 2010.
- 4.45 The long-term economic and social sustainability of a fishery depends on identifying the key ecological objectives and ensuring they are met. This means, among other things, conducting appropriate scientific studies and acquiring appropriate fisheries data to determine the ecological limits, and then clearly communicating the results to management and stakeholders. Respecting the ecological limits is central to the precautionary approach (see paragraph 4.54). In practice, it may be more difficult to spell out explicit economic and social objectives, especially ones that are consistent with the ecological limits.
- **4.46** Establish suitable plans. National fisheries managers need the mandate and capacity to develop and implement the management functions set out in legislation and policy. Fishery planning processes need to include the following elements:
 - adequate financial resources and the right numbers and types of skilled people to carry out the mandate;
 - the ability to carry out the science necessary to understand the status, trends, and cause-and-effect relationships affecting fisheries resources and the related uncertainties; and
 - a good understanding of the social and economic dynamics of the fishery.

These plans will include specifying the total catch and how that total catch is allocated. As noted above, these decisions may have the biggest influence on the direction and sustainability of a fishery.

- experience shows that having stakeholders actively involved in fisheries planning contributes to effective governance and means that they will be more likely to understand, accept, and endorse the results. A 2004 Fisheries and Oceans Canada policy document noted: "Fisheries management decision-making processes must be seen to be fair, transparent and subject to clear and consistent rules and procedures." Stakeholders can take part through data collection, knowledge gathering, collaborative research, option analysis, decision making, and other aspects of running the fishery. A 2009 study by a team of international fisheries experts surveyed management practices in all coastal countries and concluded that a participatory and transparent process for converting scientific advice into policy was a key factor in influencing whether a fishery was sustainable.
- 4.48 Adequately control fishing activity. Fisheries managers need to exercise control over the activities of fishers in a way that is adapted to the fishery resource and its socio-economic situation. Managers need to track fishing activity to ensure that participants are following legislation, conditions of access, and approved management measures. This tracking needs to be complemented by enforcement—the inspection, investigation, and legal processes to enforce legislation and fishing plans. In the end, successful control is partly determined by how well participants comply and partly by how much it costs managers to achieve the desired level of compliance. For example, the use of independent observers on fishing boats to monitor the bycatch of sea turtles in the tuna fishery is costly, which limits how much this method of ensuring compliance can be used. Consequently, it might be necessary to use complementary methods to promote compliance.
- 4.49 Evaluate whether objectives have been achieved. Managers need to evaluate whether the objectives of the fishing plans have been met. They can evaluate their success by drawing on the information collected from scientific studies, monitoring, and surveillance, and by using the information supplied by fishers themselves. High-quality and timely data can inform scientists when they determine the status of fish stocks. These data can support fisheries managers when they decide on resource use and eventually evaluate how effective fisheries plans are. Managers will typically need to integrate environmental, economic, and social information that may have been collected for different purposes. Fisheries managers can adjust fishing plans according to the results from monitoring systems and evaluations if adjustments are needed to respond to changing circumstances.

4.50 One closely related question is whether a stock is being fished sustainably. The National Oceanic and Atmospheric Administration in the United States has developed a Fish Stock Sustainability Index as an indicator of ecological sustainability; results are reported quarterly. The index reflects the Administration's view of what factors should be considered, including stock status, extent of overfishing, and production at the maximum sustainable yield. In Canada, a broader range of factors is included in a similar checklist. Similarly, the Food and Agriculture Organization of the United Nations prepares reports on the status of fish stocks using categories such as underexploited, fully exploited, overexploited, depleted, or recovering from depletion. These reports also inform readers about the ability of the stock to provide ongoing social and economic benefits.

The ecosystem approach recognizes that fisheries are part of broader natural systems

4.51 Over the last two decades, all important international fisheries agreements, starting with the United Nations Agreement on Straddling and Highly Migratory Fish Stocks, have called for an ecosystem approach to managing fisheries. The ecosystem approach goes beyond the usual focus on targeted fish stocks to consider the sustainability of non-targeted species, habitats, and ecosystems affected by fishing and other activities (Exhibit 4.8). The aim is to ensure that future generations will benefit from all of the goods and services that marine ecosystems can provide. The ecosystem approach to fisheries is a way to move toward sustainable development of fisheries.

Ecosystem approach to managing fisheries Impact of ecosystems Impact of fishing on on fisheries, including ecosystems, including · effects of other species, such as predators effects on targeted fish stocks · water quality and temperature · effects on non-targeted species, including species at risk · climate change · effects on habitat marine transportation · other effects on the marine food web · marine debris · competing uses of marine resources

Exhibit 4.8 The ecosystem approach to managing fisheries requires considering many factors

Source: Fisheries and Oceans Canada

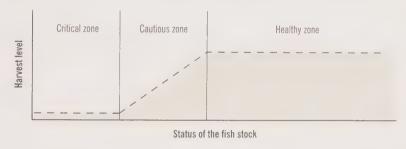
- **4.52** This approach has three major implications for managing fisheries:
 - Managers will seek to avoid overfishing targeted species and will ensure that depleted stocks are rebuilt.
 - Managers will try to minimize the impact of fishing on non-targeted species and habitat, taking into account how species interact. This practice will require a fuller understanding of the ecosystems where fisheries operate, with a greater demand for scientific analysis. Because of the greater complexity of interactions, there may be more uncertainty associated with the resulting scientific advice.
 - Compared to conventional fisheries management, a broader range of users of ocean resources, such as tourism, transportation, mineral extraction, and energy production, will participate in decision making, possibly involving new forums for discussion.
- 4.53 While experts have written about ecosystem considerations for some time, international acceptance of an ecosystem approach to fisheries is fairly recent. Fisheries organizations around the world are beginning to apply the policies and assign the resources needed to put in place such an approach. In Canada, for example, a range of additional tools is being used, including those focused on managing oceans, managing habitat, and protecting species at risk. One key step will be setting out the details of the expected ecological, social, and economic outcomes and integrating them into existing management processes.

The precautionary approach provides a way to manage uncertainty in fisheries

4.54 Even where much is known about a fish stock, managers make decisions about how to use the resource in the face of uncertainty. Marine ecosystems fluctuate naturally and are affected by fishing and other human activities. As a result, their behaviour is generally not easy to predict. For example, in 2009 and 2010, the returns of sockeye salmon on the Pacific coast fell outside of the ranges that scientists had predicted—one on the low side and one on the high side. To avoid negative and possibly irreversible results, such as overexploiting a fish stock, managers adopt a precautionary approach. This means relying on the best available information, anticipating the possible outcomes, and selecting the harvest rules and conservation measures to avoid the undesirable outcomes. The choice of responses will depend on the degree of uncertainty, the reversibility of any impacts, and the costs linked with possible mistakes.

- **4.55** By signing the United Nations Agreement on Straddling and Highly Migratory Fish Stocks, the federal government has committed to use the precautionary approach in managing these kinds of stocks. In effect, Canada has also agreed to use the precautionary approach for domestically managed fish stocks.
- **4.56** In practice, the precautionary approach involves classifying the status of a fish stock based on the scientific analysis of biological indicators, such as the estimated total weight of fish or the number of fish available to spawn. A stock may be classified as in the healthy, cautious, or critical zone (Exhibit 4.9). Decision rules set out in advance what harvests will be allowed in the different zones and what management actions will be taken to respond to the assessed status of the fish stock. As part of this approach, managers need to decide how much precaution is required and under what circumstances.

Exhibit 4.9 The precautionary approach helps managers make decisions despite uncertainty



Note: The boundary between the critical zone and the cautious zone is known as the limit reference point. The boundary between the cautious zone and the healthy zone is known as the upper stock reference point.

Source: Adapted from Fisheries and Oceans Canada

What are the properties of a sustainable fishery?

4.57 Many of the key properties of a sustainable fishery can be grouped into three categories, corresponding to the aspects of sustainable development: environmental, economic, and social. In the *Federal Sustainable Development Act*, the federal government acknowledges the need to integrate environmental, economic, and social factors when making all of its decisions. A fourth category, organizational properties, includes ways of integrating and managing the first three. We have summed up the key properties of a sustainable fishery in Exhibit 4.10. The properties are linked; one cannot be achieved apart from the others.

4.58 The four groups of challenges and the management responses based on the principles and approaches described in the previous section are summed up in Exhibit 4.11. These responses lead to the basic question of whether the management regime supports a sustainable fishery.

Exhibit 4.10 The key properties of a sustainable fishery fall into four related categories

Environmental properties	The harvest of the targeted species is maintained within conservation limits.
	 Ecological limits have been defined for the fishery and for other parts of the ecosystem, based on available scientific evidence. Where the variability in stock size or the uncertainty in stock estimates is high, a precautionary approach has been taken.
	The ecological limits for the targeted and non-targeted species have been respected.
	There is no long-term degradation of the ecosystem where the fishery operates.
	If external factors affect the health of the stock, the harvest limits are adjusted.
Economic properties	The fishery is economically competitive and produces a profit for the participants.
	The capacity of the fishing fleet is in line with the ability of the resource to sustain fishing pressure.
	Subsidies are not provided to the fishery over the long term, recognizing that support may be required for short-term adjustments.
	The fishery is able to innovate in response to external changes in the market. For example, the fishery may choose to show that it meets the criteria for eco-certification.
Social properties	Governance arrangements are clearly defined at the international, national, and local levels.
	Aboriginal rights are respected.
	 Access to the fishery is allocated equitably and predictably among the interested parties, and promotes conservation of the resource.
	The fishery contributes to sustaining the communities that depend on it.
	The fishery is able to innovate in response to social changes.
Organizational properties	The organizations that manage the fishery have well-defined mandates and lines of accountabilit
	 The organizations that manage the fishery have the resources they need to carry out their mandates, including conducting scientific research, monitoring the fishery, and ensuring compliance with legal and policy requirements.
	 Decisions about managing the fishery are based on scientific information and predictable criteria involve stakeholders, and are openly communicated.
	Effective mechanisms are in place for making trade-offs between competing objectives.
	The organizations that manage the fishery innovate in response to changing circumstances.

Environmental Economic Social **Organizational** challenges challenges challenges challenges Status of the stocks · Market changes · Effects on Decision-making communities Environmental processes Product quality variability Allocation of access Managing science Profitability privileges for · Climate change Ensuring compliance Overcapacity · Invasive species Managing budgets Subsidies Impacts of activities on land Fisheries management Governance responses Management practices Ecosystem approach

Precautionary approach

Does the fishery management regime support a sustainable fishery?

Exhibit 4.11 How managers respond to sustainability challenges will partly determine if a fishery is sustainable

What questions could parliamentarians ask?

- 4.59 Parliament has a crucial role in ensuring that fisheries are sustained in Canada—it sets the basic ground rules through legislation and oversees the federal government's activities. This study is intended to provide information to help members of Parliament to understand the core issues related to sustainable fisheries and to carry out their responsibilities. Earlier in this study we described several major challenges that fisheries managers face, including climate change, new certification expectations, and an evolving legal context.
- 4.60 In recent years, successive federal governments have introduced amendments to the *Fisheries Act*, Canada's main fisheries legislation. However, these amendments have not become law. In our 1999 audit, we concluded that the Act did not include clear objectives that reflected the social, economic, and ecological nature of sustainable fisheries. In 2005, the Government of Canada's National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and

Unregulated Fishing expressed this concern: "...there is consensus that the 138-year-old Fisheries Act is itself an inadequate tool for addressing the challenges of the coastal and inland fisheries."

- 4.61 The 1997 Oceans Act sets out Canada's mandate for the governance and management of oceans. Unlike the 1867 Fisheries Act, the Oceans Act reflects sustainability concepts such as the ecosystem and precautionary approaches, as well as integrated management of oceans. Based on their responsibilities for legislation, members of Parliament may wish to ask the following questions:
 - What specific legislative and policy tools are needed to address current and emerging issues, such as international management of fisheries, marine protected areas, and eco-certification?
 What steps are being taken to put those tools in place?
 - What legislative and policy safeguards have been put in place to ensure that fisheries decisions respect the scientifically determined ecological limits? What is the evidence that these safeguards are working as intended?
- 4.62 In our past audit work, we described obstacles to achieving sustainable fisheries. Through their own studies and reports, committees of both the House and the Senate have also documented concerns related to several fisheries, including lobster, northern cod, Fraser River salmon, Atlantic snow crab, Nunavut fisheries, and Western Arctic fisheries. Based on their responsibilities for oversight, members of Parliament may wish to ask the following questions about a group of fisheries or a single fishery:
 - What past audits and studies have been done of these fisheries by Parliament, by the Office of the Auditor General, or by departmental internal audit groups? Have the problems identified in those reports been addressed successfully?
- 4.63 This study has documented the main principles for managing fisheries sustainably. These principles relate to governance, core management practices, and the use of the ecosystem and precautionary approaches. For these principles to be implemented in the Canadian context, Fisheries and Oceans Canada must play a central role. This point leads to additional possible questions:
 - What indicators and information is the federal government using to determine if Canadian fisheries are being managed according to the principles of sustainability? What do those indicators show?

• What mandates and resources doe's Fisheries and Oceans Canada need to carry out its functions in support of sustainable fisheries, specifically in terms of making risk-based harvest decisions, allocation decisions, conducting science and monitoring to support those decisions, and ensuring compliance with regulations? How do these needed mandates and resources compare to what the Department currently has?

Conclusion

- 4.64 Will fish continue to be available in the future to provide the food and jobs on which many people have come to rely? The availability of fish cannot be taken for granted. Organizations that manage fisheries have a difficult job. They oversee and regulate the harvesting of fish in the context of significant uncertainty. The challenges they face come from environmental, economic, social, and organizational sources. Some of these challenges have been present since governments began to actively manage fisheries; other issues have emerged much more recently.
- **4.65** Our review of international guidance and other sources shows that fisheries are more likely to be sustainable when the organizations responsible for managing them take the following actions:
 - adopt relevant international agreements and guidance;
 - participate in processes for managing straddling and migratory stocks and ensure that the fisheries related to them are sustainable;
 - adopt legislation and policies that consider clearly defined social, economic, and conservation objectives, and incorporate the ecosystem and precautionary approaches;
 - engage stakeholders and communities through open and transparent processes;
 - put in place appropriate accountability arrangements;
 - use a decision-making process that is transparent, considers social and economic objectives, and respects the biological limits;
 - use the best available scientific research and analysis;
 - develop fishing plans that reflect the objectives for the fishery and provide fishers with incentives to pursue fisheries in a sustainable manner;

- develop and put in place appropriate monitoring, control, and surveillance; and
- develop an enforcement capability that promotes and ensures compliance with legislation and supports fisheries planning.
- 4.66 Even if all the elements of a strong management framework are in place, fish stocks may still fall below a sustainable level. Fish stocks are part of complex marine ecosystems that vary in productivity, independent of fishing activity. An effective management framework can, however, reduce the risk that fishing activity will endanger the long-term ecological sustainability of fish stocks.
- **4.67** Ensuring that a fishery is sustainable requires leadership and well-defined accountability from all who are responsible for and involved in the fishery. Parliamentarians may wish to ask whether the current legislative and management framework for fisheries addresses adequately the challenges described in this study and incorporates the key properties of sustainability.

About the Study

Objectives

The main objective of this study was to identify the key properties of sustainable fisheries based on generally accepted international principles and experience, with an emphasis on the principles and lessons that would apply in Canada. This study is a first step toward identifying a framework and criteria for our future audits to determine whether fisheries management practices are supporting sustainable fisheries.

Scope and approach

In 2007, the Auditor General asked an independent panel of experts, the Green Ribbon Panel, to examine how the Office of the Auditor General's environmental and sustainable development mandate had been put into practice, and to identify opportunities within the mandate to serve Parliament better. The panel's report underlined that the mandate of the Commissioner of the Environment and Sustainable Development should be focused on sustainable development as well as on how well the federal government is managing the environment.

This study focuses on one aspect of sustainable development: managing the marine capture fishery, which in Canada includes First Nations, commercial, and recreational users. The study does not include inland fisheries or aquaculture. While some aspects of the study would be relevant to either of those two areas, more information would need to be examined to address them fully.

We chose to identify properties of sustainable fisheries rather than exploring specific tools for managing fisheries. We focused on the key governance arrangements and management practices.

We identified the properties of sustainable fisheries by analyzing international guidance documents, including the Food and Agriculture Organization Code of Conduct for Responsible Fisheries and related technical guidance, studies, and academic writings. We identified properties that were found in a number of the sources we examined.

We also met with senior officials from Fisheries and Oceans Canada, industry officials, academics, and environmental groups to get their input on our analysis of the properties and their views on what a sustainable fishery involves.

Study team

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Report of the Commissioner of the Environment and Sustainable Development—December 2011

The Commissioner's Perspective

Environmental Petitions

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Report of the Commissioner of the Environment and Sustainable Development

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Chapter 5
A Study of Environmental Monitoring



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Report of the
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Chapter 5
A Study of Environmental Monitoring





The December 2011 Report of the Commissioner of the Environment and Sustainable Development comprises . The Commissioner's Perspective, Main Points—Chapters 1 to 5, an appendix, and six chapters. The main table of contents for the Report is found at the end of this publication.

The Report is available on our website at www.oag-bvg.gc.ca.

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Chapter

5

A Study of Environmental Monitoring

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Inventory of federal environmental monitoring systems





A Study of Environmental Monitoring

Main Points

What we examined

The federal government collects information about what is going on in the environment to help Canadians make decisions every day. It monitors many different aspects of the environment, including solar flares, weather, air quality, migratory birds, fish, insects that carry human diseases, forests, water quality and quantity, changes in permafrost, and the ecology of national parks.

We conducted this study to develop an inventory of systems the federal government uses in monitoring the state of the environment; to identify the challenges associated with environmental monitoring; and to highlight good environmental monitoring practices. Together these serve as a basis for criteria for future audits of environmental monitoring conducted by the federal government.

We studied the environmental monitoring systems of several federal departments and agencies with responsibilities related to the environment. We interviewed expert officials from those organizations and from other jurisdictions, and reviewed the relevant literature. This included past observations and recommendations by our office; however, we did not follow up to determine what progress had been made.

This document is not an audit report. For this reason, our observations should not be seen as an assessment of the federal government's current practices or performance with respect to environmental monitoring. Because this is a study, it is descriptive and does not include recommendations.

Work for this chapter was completed on 31 July 2011.

Why it's important

Environmental monitoring is critical to knowing whether the quality of our environment is getting better or worse. Information gathered through environmental monitoring is important to many different decision makers, inside and outside the federal government. With the results of monitoring, the federal government can make informed decisions about how the environment will affect Canadians and how Canadians are affecting the environment. Outside the federal

government, the information is used by many people, such as municipal engineers to design flood control systems or public health experts to design effective policies. Timely and effective responses to environmental emergencies, such as spills, are impossible without adequate information. Farmers, hunters, foresters, and fishers all need to know what is happening to the natural resources they rely on.

The Canadian federal government shares responsibilities for environmental monitoring with businesses, local governments, provincial and territorial governments, and other national governments. Based on a Statistics Canada survey of federal science activities, we estimate that the federal government spends more than \$500 million each year on different environmental monitoring activities and assigns more than 2,500 people to these activities.

What we found

- Environmental monitoring generates the critical information that is essential for the federal government to provide sound stewardship of the environment. The government uses the information to assess the current state of the environment, to predict the future environment, and to develop sound strategies for adapting to environmental change. For example, daily weather forecasts rely on a complex set of linked environmental monitoring systems.
- Environmental monitoring systems are most successful when they are well coordinated with other systems, when the right partners participate, when quality is built in from the beginning, when reports are designed to be useful, and when resources are used efficiently. For example, some monitoring systems rely heavily on expensive tools and equipment, such as satellites or scientific research vessels, that need to be managed carefully with respect to their long-term benefits and costs.
- Well-managed environmental monitoring systems can provide a basis for Parliament to hold departments and agencies accountable for their environmental stewardship.

RADARSAT2 satellite supplies information about ground conditions to several different monitoring systems.

Photo: Canadian Space Agency

Environmental monitoring system— A system that combines the processes of obtaining, assembling, synthesizing, and reporting repeated and systematic measurements or observations of environmental characteristics.



Environment Canada laboratory technicians process water samples to assess water quality.

Photo: Environment Canada

Introduction

- 5.1 Canadians benefit daily from environmental monitoring in all aspects of their lives. Canadian families rely on weather forecasts to find out whether to bring sunscreen to the beach or brace for a winter storm. Insurance companies have to make provisions for potential claims resulting from flooding on the Prairies, in Quebec, or elsewhere in the country. Arctic communities want to know whether the food they hunt has high levels of toxic chemicals, such as mercury. And fishers on all three coasts depend on the federal government for decisions about how many fish can be caught.
- vast array of information about the state of the Canadian economy, such as how many people are employed, what is being exported or imported, and how quickly the economy is growing. This information is supplied to individuals, businesses, investment analysts, and governmental finance departments, among others. Similarly, an environmental monitoring system collects information about the environment and distributes it to people who need the information to make decisions. Environmental information is obtained using a vast spectrum of approaches, ranging from radar satellites that peer through clouds, to sophisticated chemical analyzers that measure air quality, to foresters counting the number of trees of certain species and sizes at a given location.
- 5.3 The Government of Canada shares responsibilities for environmental monitoring with businesses, local governments, provincial and territorial governments, and other national governments. Based on a Statistics Canada survey of federal science activities, we estimated that every year, the federal government spends more than \$500 million on environmental monitoring activities and assigns more than 2,500 people to these activities.

Focus of the study

5.4 Because environmental monitoring plays a central role in the everyday lives of Canadians and the way Canada's resources are managed, we decided to provide Parliament with a description of these monitoring activities. Our specific objectives for this study were to document the key challenges associated with environmental monitoring, to describe the active Canadian federal monitoring systems, and to highlight good monitoring practices in other jurisdictions. In addition, this study serves as a basis for future audits

of monitoring systems and for questions that members of Parliament might wish to ask about such systems.

- **5.5** We looked at the monitoring activities of the 11 main federal departments and agencies that have environmental monitoring responsibilities:
 - · Aboriginal Affairs and Northern Development Canada
 - Agriculture and Agri-Food Canada
 - Canadian Food Inspection Agency
 - Canadian Space Agency
 - Environment Canada
 - Fisheries and Oceans Canada
 - · Health Canada
 - Natural Resources Canada
 - · Parks Canada
 - Public Health Agency of Canada
 - · Statistics Canada

Based on this examination, we prepared an inventory of national monitoring systems that assess the state of the environment. More details are given in the Appendix.

- 5.6 This document is not an audit report. For this reason our observations should not be seen as an assessment of the federal government's current practices or performance with respect to environmental monitoring. Because this is a study, it is descriptive and does not include recommendations.
- 5.7 At the same time as this study, we conducted an audit of how environmental scientific activities are managed at Environment Canada and how these activities support decision making (Chapter 2 of this report, Environmental Science). Scientific research complements monitoring as another source of information, providing a foundation for good environmental management.
- 5.8 More details about the study objectives, scope, and approach are in **About the Study** at the end of this chapter.

Observations

How is information from environmental monitoring used?

5.9 Environmental monitoring is critical to understanding whether the quality of our environment is getting better or worse. Information gathered through environmental monitoring is important to many decision makers, outside and inside the federal government.

Monitoring is essential for making well-informed decisions about the environment and how it will affect Canadians

- **5.10** Outside the federal government, many people and organizations use the results of environmental monitoring to manage the environment and the way Canadians interact with it:
 - Health professionals. Public health officials are concerned about short-term environmental impacts, such as poor air quality and the need to issue smog advisories. They are also concerned about long-term health effects, such as the presence of toxic substances in the environment and human bodies.
 - Planners. Municipal engineers responsible for designing flood control systems need to know the maximum height to which water levels could rise. When they set premiums, insurance companies need accurate information about current and future environmental risks. If they lack sound information, they pay a real financial cost.
 - Emergency responders. When an earthquake or a major industrial accident occurs, it is vital to know without delay exactly where it occurred and how severe it is; armed with accurate and timely information, responders can deliver rapid and targeted assistance. Magnetic disturbances caused by solar flares induce electric currents in long conductors, such as power lines and pipelines, and can lead to power system outages or pipeline corrosion. Monitoring information can help emergency managers predict and respond to such events.
 - Resource managers. Farmers need to know the short-term weather—for example, to help them decide when to harvest their crops. They also rely on information about long-term climate trends—for example, when deciding how to respond to declining water supplies. Mining companies in the North need to know whether changes in permafrost and the extent of sea ice will affect their access to resources.

• Industries. Wind power developers need reliable information about wind patterns and bird migration routes to plan their facilities. Major industries need to monitor their own environmental effects to ensure that they comply with regulations. For example, the National Pollutant Release Inventory requires many businesses in Canada to measure and report how much pollution they release into the environment from their facilities.

The federal government relies on environmental monitoring for crucial management information

5.11 Within the federal government, environmental monitoring generates information that is essential for several core management functions.

5.12 Designing environmental management programs.

Environmental monitoring describes the starting point against which targets can be set and progress evaluated. One key step in developing an environmental management program is assessing the current state of the environment. For example, in 2010, the federal, provincial, and territorial governments worked together to produce a report on the status and trends in Canada's ecosystems. Exhibit 5.1 summarizes some of the conclusions in that report, entitled Canadian Biodiversity: Ecosystem Status and Trends 2010. This report highlights the key areas of concern.

Exhibit 5.1 Canadian governments have assessed the status and trends of Canada's major ecosystems

Forests—Some are healthy and not changing; some are showing signs of stress and are deteriorating.

Grasslands—These ecosystems are impaired and deteriorating.

Wetlands—These ecosystems are showing signs of stress and are deteriorating.

Lakes and rivers—These ecosystems are showing signs of stress and are deteriorating.

Coastal ecosystems—Some are healthy and some are showing signs of stress, but all are deteriorating.

Marine ecosystems—Some marine mammal populations are healthy and are recovering rapidly; other parts of the ecosystems, including commercial fisheries, are impaired and deteriorating rapidly.

ice ecosystems—These ecosystems are impaired and deteriorating rapidly.

Source: Summarized from Canadian Biodiversity: Ecosystem Status and Trends 2010

- 5.13 A second key step in designing programs is deciding which actions to pursue. Environmental monitoring results provide a basis for designing models that can be used to predict the future consequences of management actions. The predictions could be of the weather tomorrow, the climate in 40 years, or the amount of fish that can be harvested sustainably given population projections. Monitoring results are also used to check and improve the model predictions over time. These kinds of predictive tools can then be used to compare alternative management actions.
- **5.14** Allocating resources efficiently. Knowing where the problems are makes it possible to target management action efficiently. For example, moose population monitoring done by Parks Canada identified areas of high population density and forest damage, and helped direct corrective action.
- 5.15 Assessing the environmental effects of past and present projects. When projects are assessed under the Canadian Environmental Assessment Act for their possible environmental effects, follow-up programs may be required to determine whether the observed effects are consistent with the predictions and whether actions to mitigate the possible effects are working as planned. Such monitoring programs are put in place for about 5 percent of environmental assessments. The environmental effects are typically restricted to a single location; however, when the effects of more than one project are combined, as in the case of the oil sands region of northern Alberta, project planners may need to consider the cumulative effects of the different projects (Chapter 2 of the 2011 October Report of the Commissioner of the Environment and Sustainable Development, Assessing Cumulative Environmental Effects of Oil Sands Projects). In the case of contaminated sites related to completed or abandoned projects, such as mines, continuing attention may be required if pollutants are being released into the environment.
- 5.16 Evaluating compliance with environmental regulations. Environmental monitoring produces the information to evaluate performance in relation to regulations. For example, ground-level ozone—a component of smog—increased from 1980 to 2009 in southern Ontario. By comparing smog levels with regulatory limits, authorities can make decisions about how they should respond to protect public health and environmental quality. Compliance monitoring is based on specific regulations and a situation in which non-compliance may result in enforcement action. (Chapter 3 in this report, Enforcing the Canadian Environmental Protection Act, 1999,

presents the results of an audit of how Environment Canada enforces the Act.) Industry and the federal government may share the responsibilities for compliance monitoring. Statistics Canada has estimated that Canadian industries spent \$329 million on environmental monitoring in 2008, out of a total of about \$9.1 billion that they spent on all aspects of environmental protection.

- **5.17** Monitoring also provides a way of determining whether regulations and enforcement actions are working as expected. If the regulations are being followed but the state of the environment is not improving as planned, changes may be needed to the regulatory approach.
- 5.18 Promptly identifying problems. Environmental monitoring may also produce information about emergencies that require an immediate response, as well as processes that take longer to unfold. For example, federal managers may need to act very quickly in response to a disease in wildlife that threatens domestic animals or that potentially affects the food supply for Canadians. Long-term changes in glaciers in the Rocky Mountains with the related consequences for irrigation supplies will demand a different approach.
- 5.19 Complementing scientific research. Environmental monitoring is closely tied to scientific research. Research can identify and describe the cause-effect relationships that underlie monitoring programs. For example, when managers of a monitoring program choose particular types of water pollutants for measurement, the decision is based on the research documenting the effects of those pollutants on aquatic plants and animals. Researchers can also help design the equipment and methods that allow monitoring programs to ask new questions or obtain more accurate results. In turn, unexpected results from monitoring can trigger new research.

What environmental monitoring is the federal government doing?

5.20 Canada's environment is affected by many influences whose origins are beyond our borders. For example, the far-reaching effects of hurricanes that start in the middle of the Atlantic Ocean demonstrate that Canada's weather is part of a global system. The migratory ducks shot by hunters on the Prairies may have crossed several national borders before reaching their destinations in Canada. And the toxic substances that accumulate in Canada's Arctic come from all over the planet.

- **5.21** The federal government is directly involved in environmental monitoring for several reasons:
 - the need to negotiate with other countries and jointly manage the global environment;
 - the need for coordination and consistency within Canada;
 - the constitutional division of powers; and
 - the federal government's exclusive responsibilities in certain areas, such as oceans and federal lands. Among the lands controlled by the federal government are national parks and national park reserves, which cover 30.3 million hectares (about 3 percent of Canada's land area).

Legislation and international agreements require Canada to monitor the environment

- 5.22 Several federal laws require environmental monitoring, either directly or indirectly. One example is the *Canadian Environmental Protection Act*, which requires the Minister of the Environment to monitor the state of the environment and to report on the results periodically. The approach to meeting this requirement has evolved (Exhibit 5.2). As a second example, the *Canada National Parks Act* requires Parks Canada to report every two years on the ecological integrity of all 42 national parks. The ecological integrity monitoring programs of Parks Canada are designed to support this requirement as well as its legal obligation to perform management planning. In all, over 13 federal laws entail direct or indirect requirements to monitor the environment. In addition, some land claim agreements have required monitoring programs.
- 5.23 Agreements with other countries may also lead to monitoring requirements for the federal government. For example, the Great Lakes Water Quality Agreement with the United States includes a requirement for a "coordinated surveillance and monitoring program in the Great Lakes System." The program is intended to
 - assess compliance with pollution control requirements,
 - track progress on the agreement's objectives,
 - provide information for determining how the Great Lakes have responded to control measures, and
 - identify emerging problems.

Exhibit 5.2 Reporting on the state of the environment has evolved since 1986

Canada has a long tradition of reporting on the state of the environment, based on its monitoring programs. The first comprehensive national report was prepared as a joint effort between Environment Canada and Statistics Canada in 1986. It covered a wide range of topics, from forest ecosystems to contaminants in the environment. Larger and more detailed reports were prepared in 1991 and 1996. Environment Canada then shifted to a different approach using a mix of publications and resources.

In 2004, Environment Canada began working with Health Canada and Statistics Canada on a new set of indicators: the Canadian Environmental Sustainability Indicators. Annual reports were prepared from 2005 to 2008, giving details on air quality, water quality, and greenhouse gas emissions. Since then, the set of indicators has been expanded to include measures of air pollutant emissions, water pollution, water levels, protected areas, and risks to the health or survival of wildlife species. There are plans to expand the set further, notably to support the new Federal Sustainable Development Strategy.

In parallel, Statistics Canada has continued to produce its core compilation of 'environmental statistics and analysis, entitled *Human Activity and the Environment*. The first issue was released in 1978 and the second appeared with the first state of the environment report in 1986. The compilation now appears annually, with the latest issue released in June 2011. This publication combines analysis of the results of environmental monitoring with the socio-economic information Statistics Canada collects through a variety of surveys and other instruments.

The federal government has led other state of the environment reporting efforts that are more narrowly focused—for example, covering the state of the Great Lakes or national parks, agri-environmental indicators, the status of ecosystems, and (since 1992) the relationships between human health and the environment. The government has contributed as well to several international reports, such as those by the Commission for Environmental Cooperation of North America. In addition, several provinces and territories have prepared state of the environment reports and indicators.

5.24 As a member of the World Meteorological Organization, Canada has obligations to collect and share weather, water quantity, and climate information with the global community. Of the almost 100 international environmental agreements Canada has signed, more than 33 create monitoring requirements for the federal government. In some cases, international agreements have led to standards or protocols for conducting monitoring to ensure country-to-country compatibility. For example, standards and protocols have been put in place for measuring acid precipitation, stratospheric ozone, persistent organic pollutants, and water quality.

Current federal monitoring systems track many aspects of the environment

5.25 To give Parliament a clearer picture of the environmental monitoring conducted by the federal government, we have prepared an inventory of federal monitoring systems. During the study, we did not identify any other recent government-wide attempts to summarize Canada's environmental monitoring. Other recent inventories of

federal monitoring systems have been limited in scope: they focused on the mandate of a single department (such as Fisheries and Oceans Canada) or a specific region (such as northern Canada). The Appendix presents a summary of our approach and the inventory.

5.26 We identified 94 monitoring systems or clusters of monitoring systems in our inventory. As explained in the Appendix, in some cases we had to combine monitoring systems to avoid a list that would be unwieldy and of limited use to Parliament. The combined systems are listed under the following components of the environment: water, plants and animals, and other (Exhibit 5.3). The monitoring systems for plants and animals outnumber those for other components; this is partly because of the federal government's responsibilities for migratory birds and fisheries, as well as the diversity of species in this component. Note that there are several ways we could have grouped monitoring systems, given the similarities and links between them.

Exhibit 5.3 Levels of monitoring vary depending on the component of the environment

Environmental component	Number of monitoring systems?
Air and atmosphere	. 20
Water	19
Soil and landforms	3
Contaminants in several components	4
Plants and animals	32
Ecosystem processes	3
Human population	6
Other	7

^{*} In some cases, monitoring systems are clusters of systems.

5.27 Environment Canada has the widest range and largest number of monitoring systems of any department or agency (Exhibit 5.4). This reflects its responsibilities, including for monitoring weather, air and water; managing toxic substances; and tracking bird populations. Fisheries and Oceans Canada monitors fisheries as part of its mandate to manage fisheries resources. Other departments and agencies have different roles. For example, the Canadian Space Agency does not directly manage monitoring systems, but it contributes data in support of many of the systems in the inventory managed by other departments.

Exhibit 5.4 The number of monitoring systems varies across departments and agencies

Department or agency	Number of monitoring systems
Aboriginal Affairs and Northern Development Canada	2
Agriculture and Agri-Food Canada	5
Canadian Food Inspection Agency	4
Environment Canada	41
Fisheries and Oceans Canada	25
Health Canada	6
Natural Resources Canada	9
Parks Canada	1
Public Health Agency of Canada	6
Statistics Canada	1

^{*} In some cases, monitoring systems are clusters of systems. Where there is no single lead department, we have included all key departments.

- **5.28** Based on information from departments and agencies, we estimated that 55 percent of the monitoring systems were based directly on federal legislation. Systems without a direct legislative basis may still contribute to meeting departmental mandates. For example, while not directly required by legislation, measuring contaminants in bird eggs has helped to
 - set regulatory priorities for toxic substances,
 - · assess the success of the resultant management actions, and
 - meet international agreements.
- 5.29 The monitoring systems we looked at use a vast range of approaches and methods, depending on what they measure. For example, we asked departments and agencies about the number of monitoring stations in each system. We were told that the system for tracking water flows and levels in Canada's lakes and rivers has approximately 2,117 stations. In contrast, a network of 16 stations measures ultraviolet (UV) radiation; the resulting data is used for calculating the UV index featured in daily weather forecasts across the country.
- 5.30 The monitoring systems also vary widely in age, with some systems going back many decades. For example, agricultural research stations have collected soil samples for over 100 years; they can now supply answers to questions that had not been posed when the samples

were first collected. Some of the more recently introduced monitoring systems represent new technologies, new scientific perspectives, or emerging requirements. For instance, satellite-based monitoring coordinated through the Canadian Space Agency and the Canadian Centre for Remote Sensing (part of Natural Resources Canada) is generating a wealth of information about the Canadian landscape and how it is changing.

5.31 Our past audits of federal monitoring systems found some gaps, such as the more limited coverage of Arctic regions compared to southern Canada. Northern monitoring poses logistical and financial challenges because of the distances and harsh environment. Other assessments have noted that some components of the environment are still poorly understood, and are not monitored regularly or at all; they include insects and some groups of marine species. Monitoring systems in other countries show similar limitations. A recent report by NatureServe Canada, a non-profit conservation organization, commented on the lack of a central repository for information about the geographic range of Canada's plants and animals. Such gaps highlight the trade-offs managers must make between the value of environmental information and the cost and effort required to obtain it.

What contributes to a successful monitoring system?

5.32 One of the goals of this study is to identify the characteristics of a successful and effective monitoring system. To do this, we first describe the key features of a well-managed monitoring system, and then identify the main challenges and how they can be met. We also consider some practices in other jurisdictions that might be applicable to the Canadian federal context.

Successful monitoring systems share similar traits

- 5.33 Despite the wide range of monitoring systems in use, we observed that well-managed systems share similar features. We reviewed the literature and consulted with departments and agencies. On the basis of what we learned, we were able to identify eight features that, in our view, represent good practices for designing and putting in place a monitoring system (Exhibit 5.5).
- **5.34** Before implementing a specific monitoring system, we observed that it is critical to have a coordinated and strategic vision of
 - what needs to be monitored,
 - how the different monitoring systems fit together,

- · how the information will be reported, and
- how the monitoring results will be used.

Having a strategic vision means understanding the requirements based on departmental mandates and agreements with other jurisdictions. It includes determining which organizations will be involved and what their responsibilities will be, so that there will be no gaps or overlaps. The vision can also spell out how long monitoring systems should be in place and how they should change depending on the results obtained. It can specify the common methods and standards to be used so that results from different systems can be compared and integrated. For example, the vision could specify the use of a common set of geographic boundaries.

Exhibit 5.5 Well-managed monitoring systems share certain features

Features

1. Design

The design addresses the objectives of the monitoring system, what will be monitored, how the data will be used, what indicators will be prepared, and how stakeholders will be involved. The geographic and temporal details have been determined—for example, frequency, timing, location, and density of monitoring stations.

2. Implementation

The parties responsible for each aspect of the system have been identified and have received the necessary training. The methods and sampling strategies have been tested and documented. Contingency plans are in place to respond to problems.

3. Data collection

Procedures and practices to obtain the data are established and applied. The samples and data records are documented and archived.

4. Quality control

The methods are consistently applied, following guidelines and standards. Other quality controls are in place to maintain the integrity of the data sets.

5. Synthesis and analysis of the data

The data are converted into summary forms, such as maps or graphs. Indicators are calculated and used to compare results to those for other times and locations, using statistically sound methods.

6. Internal reporting and communication

The results are communicated within the organizations responsible for monitoring. The data are available internally with a description of their properties and their limitations.

7. External reporting and communication

The results are communicated to external audiences (the public, Parliament, or international bodies, such as the secretariats responsible for international agreements). Specialized users have access to detailed monitoring results.

8. Audit and review of the system

Audits or evaluations of the monitoring system are conducted to assess whether it is achieving its objectives, and to identify opportunities for improvements.

5.35 Well-designed monitoring programs can help reduce the costs associated with environmental management by identifying where the real problems are and enabling governments to target resources effectively. For example, the United Kingdom reduced the amount of data it needed to collect through its air quality monitoring network. It recognized that modelling could provide adequate estimates of air quality, even if not all stations were operated or if they did not collect information on all possible air pollutants. Modelling is increasingly recognized as a complement to on-the-ground monitoring.

Monitoring systems can present different challenges, depending on their purpose, nature, and size

- **5.36** Monitoring systems pose general management challenges in areas such as coordination and governance, coverage, comparability, timeliness, data quality, accessibility, and effective reporting. Our past audit work has documented several instances of deficiencies in these areas. For example, in 2009, we observed that Fisheries and Oceans Canada did not systematically monitor fish habitat.
- Canadian federal context, such as the division of responsibilities within and between federal, provincial, and territorial levels of government. To reduce costs and avoid duplication, governments often jointly establish and operate monitoring systems—for instance, applying principles such as those developed by the Canadian Council of Ministers of the Environment. This collaboration requires establishing the appropriate arrangements, both formal and informal. Still other kinds of challenges may depend on the nature of the monitoring system. For example, federal departments have set up some information collection programs that rely on direct observations by Canadian citizens. The programs may reduce costs but increase requirements for quality control.

Environment—The Canadian Council of Ministers of the Environment is comprised of the environment ministers from the federal, provincial, and territorial governments. These 14 ministers normally meet at least once a year to discuss national environmental priorities and determine work to be carried out under the auspices of the Council.

Canadian Council of Ministers of the

Coordination helps ensure that monitoring objectives are appropriate and the right partners are involved

- **5.38** Environmental managers in some countries (such as Sweden, Australia, and Finland) have observed that coordination contributes to effective environmental monitoring and helps provide a more complete picture of the state of the environment. The challenge is finding the best way to integrate environmental monitoring into the systems and practices of environmental management. The key aspects include
 - setting environmental objectives,

- · clarifying roles and responsibilities, and
- setting a strategic direction.
- be more accurately targeted when they are based on national environmental objectives. In Sweden, for example, a set of 16 national objectives has been translated into regional and local objectives. Intermediate targets are now associated with the objectives, and monitoring systems are used for tracking progress toward those targets. Negotiations to achieve these kinds of objectives may be more difficult where different jurisdictions share responsibilities for environmental management, as they do in the United States, Canada, and the European Union.
- 5.40 Clarifying roles and responsibilities. In previous audits of monitoring programs, we identified the need for the federal government to formally coordinate priorities and activities among its departments and among the different levels of government, such as provinces, territories, and local governments. Coordination among different organizations can reduce duplication, identify gaps, and help ensure nationally consistent approaches. The coordination is particularly important because federal departments and agencies rely on other parties to contribute to their monitoring programs in about 93 percent of the systems included in our inventory.
- 5.41 The federal government also needs to coordinate with the governments of other countries in regions such as the Arctic and the Great Lakes, and in dealing with resources such as the fish stocks that move into and out of Canada's exclusive economic zone. For meteorological measurements, the World Meteorological Organization is leading the development of a global "network of networks." Other national and international agencies are promoting a Global Earth Observation System of Systems to improve the tools available for monitoring different aspects of the environment, including monitoring from space.
- 5.42 Within the federal government, monitoring responsibilities need to align with the different environmental components so that departments can coordinate their efforts rather than work against each other. For example, do water quantity monitoring programs fit best with programs for rainfall monitoring or programs for water quality monitoring? Who monitors the intertidal zone at the boundary between terrestrial and marine ecosystems? Should fisheries biologists focus on monitoring fish populations or the many facets of the

Ecosystem approach—An approach to environmental management that considers all aspects of an ecosystem—air, water, plants, animals, humans and their interactions—when addressing critical environmental issues. This approach also takes into account the social and economic factors relevant to ecosystem health and recovery.

ecosystem in which those fish live? Both Environment Canada and Fisheries and Oceans Canada have adopted the ecosystem approach, which leads to a broader view of environmental management, and which could help answer these kinds of questions.

- 5.43 Setting a strategic direction. When defining strategies, one needs to set priorities. Priority setting involves identifying the most important monitoring systems, determining where additional resources are most needed, and reallocating resources to higher-priority needs. It also involves identifying the data gaps that need to be filled to inform decision makers about the most important environmental risks and trends. An example of priority setting is Australia's National Plan for Environmental Information, put in place in 2010. It is intended to coordinate and set priorities for the way the Australian government as a whole collects, manages, and uses environmental information. The Canadian Environmental Sustainability Indicators initiative is intended to play a similar role in Canada (Exhibit 5.2).
- 5.44 One of the challenges in setting a strategic direction is deciding how to split monitoring efforts between well-understood current issues and new issues. An example of the latter would be the emerging effects of climate change in the Arctic, a matter that requires coordination between circumpolar countries. Throughout our study, we observed repeatedly the value of long-term and consistent information collection.

Building in quality at every step will yield sound results

- 5.45 Statistics Canada and other national and international statistical agencies have identified the features of high-quality statistical information (Exhibit 5.6). The same characteristics may be applied to environmental monitoring systems. As Statistics Canada notes, there may be trade-offs between different features. In addition, the resources available will affect how much and what kind of quality can be achieved by the monitoring system.
- When sound statistical methods are used to design monitoring systems and analyze data, the resulting reports will be much more credible, especially in the case of controversial matters. For instance, the monitoring programs for the environmental effects of oil sands mining in northern Alberta are undergoing revision, partly to enhance their statistical credibility.

Exhibit 5.6 Statistics Canada has summarized the characteristics of high-quality information

Relevance

The information sheds light on the issues of most importance to users.

Accuracy

The information correctly describes the phenomena it was designed to measure. Accuracy can be measured by the extent of errors in the estimates.

Timeliness

The information is available as soon as practical after the period to which it refers. More timely information may mean that it is less accurate.

Accessibility

The information is easy to obtain, the public is made aware of it, the format is suitable, and the cost is reasonable.

Ease of interpretation

Supplementary information is available to help in interpreting and using the information appropriately. This additional information normally covers the underlying concepts, variables, and classifications; the methods of data collection and processing; and the accuracy of the statistical information.

Coherence

The information can be combined with other related information collected at other times within a shared analytical framework. The use of standard concepts, classifications, and common methods promotes coherence.

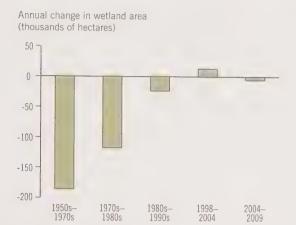
Source: Adapted from Statistics Canada

- 5.47 Managers can use a variety of approaches to build quality into a monitoring system, depending on the kinds of activities required. For example, certification of laboratories or use of International Organization for Standardization (ISO) standards can result in procedures and frameworks that provide quality assurance in specific areas.
- **5.48** The wetland monitoring program set up by the US Fish and Wildlife Service has produced several rounds of measurements and estimates documenting gradually slowing losses of wetlands (Exhibit 5.7). Professional statisticians and biologists were involved in the design of the program and later as independent reviewers. A similar approach could be used to measure land use changes in other contexts.

Good internal and external reporting provides information that will be useful and used

5.49 One of the key challenges in preparing reports on the results of monitoring systems is making the link back to environmental indicators, if they exist, and from there to national environmental objectives. These links will help internal and external users understand the implications for environmental management and performance.

Exhibit 5.7 A sound statistical design underlies the estimates of wetland trends in the United States



Note: Time frames are approximate.

Source: US Fish and Wildlife Service

5.50 In general, it is a good practice to make the results of monitoring systems widely available, provided that the information is accompanied by documentation to allow the results to be interpreted properly. Sometimes managers may need to limit access to sensitive information. For example, information about the location of endangered plants is sometimes restricted to prevent damage to the plants and their habitat.

5.51 The US Geological Survey has created a tool for communicating water quality and water quantity information to the public. The data from sensors around the country is posted on the Internet within a few hours of being collected. Inside and outside the Geological Survey, users can look at current results or can check earlier data to examine seasonal trends. This means, for example, that users can see how heavy rainstorms affect river levels and sediment in the water. Similar tools may be particularly useful to those responsible for responding to extreme weather events.

Life-cycle costs—Costs of managing a monitoring system throughout its planning and use. Assessing total life-cycle costs involves taking a broad and long-term view by recognizing all of the costs, as far as practicable, associated with meeting a requirement. Generally, life-cycle costs are divided into four broad categories:

- planning costs, including administrative and other costs.
- acquisition costs, including administrative and design/production costs associated with the goods or services in question;
- operating and use costs, including introduction and contingency costs, and prediction of useful life; and
- · disposal costs.

Source Public Works and Government Services Canad

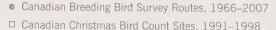
Efficient use of resources helps monitoring systems meet their objectives

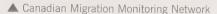
5.52 Managing assets. Some monitoring systems rely heavily on expensive equipment, such as satellites, radar stations, or scientific research vessels. These assets need to be managed with careful attention to their life-cycle costs, the risks associated with using the equipment, and the benefits that may ensue. For example, in the transition from one type of research instrument to another, or from one satellite to its replacements, it is important to ensure continuity and comparability in the data collected. Equipment management and

maintenance is also a concern with new and complex technologies such as DNA-based sampling programs, real-time monitors, and remote autonomous vehicles for underwater measurements.

- data and samples. Managing these kinds of information assets poses similar challenges as managing physical assets. In addition, proper documentation and archiving are necessary so that information can continue to be accessed and used for examining long-term trends. These procedures are especially important with the vast quantities of data flowing from automated data sensors, such as satellites. In the case of biological samples, specialized taxonomic expertise may be required to maintain the material and make accurate comparisons with new samples. Sometimes formal arrangements may be needed to address issues of ownership and control of the data.
- 5.54 Managing human resources. The people involved in environmental monitoring may be highly specialized experts or local volunteers. For example, to measure biodiversity along the Nova Scotia coast, volunteers collected samples from the coastal area as part of the Natural Geography In Shore Areas program, part of the international Census of Marine Life.
- 5.55 What is the best mix of people to deliver a monitoring program and what training should they receive? Sweden, the United Kingdom, and other countries are using citizen volunteers to monitor features of the environment, such as water quality or animal populations. Experts train the volunteers, guide them during the sampling, and perform quality control of the results. The European Environment Agency has put in place Eye On Earth, a system that combines continuous automated reports on air quality across Europe with the qualitative ratings provided by citizens near the monitoring stations. The model of combined systems, with citizens directly involved in monitoring, could be applied to similar situations in Canada.
- 5.56 A challenge common to Canada, Australia, and the United States is the uneven geographic distribution of the human population. The distribution affects monitoring programs that rely on human observers—for instance, programs that use volunteer birders to record the trends in population size of bird species (Exhibit 5.8). To compensate for the uneven sampling effort, the programs may have to bear the expense of using professional biologists and arranging transportation and supplies for them.

Exhibit 5.8 Observations of bird populations are concentrated in southern Canada







Note: The Christmas Bird Count is not funded or managed by Environment Canada, but is included because it complements the other observation networks.

Source: Canadian Wildlife Service, Environment Canada

Traditional ecological knowledge-

A cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living things (including humans) with one another and their environment. It includes the knowledge of elders, current land users, and other community members. Traditional knowledge is an attribute of societies with historical continuity in resource use gractices.

Source. Aboriginal Affairs and Northern Development Canada

- 5.57 Some managers have used traditional ecological knowledge to complement scientific monitoring. This may offer opportunities to expand the capacity and legitimacy of the monitoring system. Nevertheless, it is important to ensure internal consistency, repeatability, and independence. Traditional knowledge has been used, for example, in the Northwest Territories to track the cumulative effects of development projects there.
- 5.58 Managing financial resources. The federal government allocates substantial resources to collect information about the environment and to supply it to Canadians (paragraph 5.3). Monitoring programs require continuity of funding to be able to supply reliable and consistent data, and support detection of long-term trends. The government is only one of the sources of funding for monitoring activities. Examples of other sources include:
 - Canada receives money from the United States to monitor migratory birds.
 - Cost-sharing agreements with the provinces fund the water quantity monitoring program.

 The fishing industry provides financial support for some of the marine environment monitoring conducted by Fisheries and Oceans Canada.

With external funding, it is particularly important to ensure continuity, control the coordination costs, and ensure independence of the results.

- 5.59 One way of reducing costs has been to piggyback some monitoring programs on others, taking advantage of samples that are already being collected. Fisheries and Oceans Canada has used this approach for the wide range of sampling programs being run simultaneously during scientific cruises. Environment Canada has used the same approach for tracking toxic substances under the Chemicals Management Plan. Internationally, cooperation between space agencies has helped reduce total costs.
- 5.60 Using reviews, evaluations, and audits. Analytical reviews, evaluations, and audits can help promote the efficient use of resources by comparing the intended purposes of monitoring systems with what is actually being achieved in the context of environmental management programs. For example, Environment Canada is reviewing all of its bird monitoring systems to identify needed modifications. In the United States, the Government Accountability Office audited a national set of ecological indicators. It assessed whether changes to US federal monitoring systems might affect the ability of those systems to provide the data necessary to support the indicators.
- 5.61 The challenges and solutions we have discussed are interrelated and cannot be treated in isolation. For instance, a statistically sound design for a monitoring system can improve the quality of the information obtained, while reducing the costs to obtain information of that quality. A sound design may also make a clearer link to environmental objectives and produce more credible final reports.

What questions could parliamentarians ask about environmental monitoring?

5.62 Parliament has a crucial role in ensuring that the environment is properly managed in Canada: it passes legislation that sets the basic ground rules for the federal government, and it oversees the government's activities. This study provides information to help members of Parliament understand the core issues related to environmental monitoring and carry out their responsibilities. Several pieces of legislation, such as the *Species at Risk Act*, assume that timely and reliable monitoring data is available to make decisions. If the data is unavailable, it may not be possible to implement the law properly. Based on the analysis in this study, we have identified several questions

that members of Parliament may wish to ask when holding departments and agencies to account for their stewardship of the environment.

- **5.63** In terms of their legislative responsibilities, members of Parliament may wish to ask the following questions:
 - What monitoring is required to report on the state of Canada's environment? Is that monitoring in place?
 - What monitoring is required to determine whether environmental legislation is working as intended? Is that monitoring in place?
 - What specific steps have been taken to avoid duplication or gaps when working with the provinces and territories?
 - What environmental components or geographic regions are not being monitored now? What are the consequences of these gaps?
- **5.64** It could be particularly useful for members of Parliament to have a realistic understanding of the challenges associated with environmental monitoring systems as they consider information about federal monitoring systems and the results of audits and evaluations. In terms of their oversight responsibilities, parliamentarians may wish to ask the following questions in relation to particular monitoring systems:
 - How does this monitoring system fit into the set of monitoring systems in place?
 - What are the priorities for environmental monitoring? How were they established?
 - Who is using the information collected by this monitoring system? How does the federal government know the information is being used for its intended purpose?
 - How does the federal government ensure that reports are timely and accurate?
 - Who is funding the monitoring system? What steps have been taken to ensure continuity of funding, accountability, and independence?
 - Did the Office of the Auditor General of Canada or departmental internal audit groups conduct audits and evaluations of this monitoring system? Have the problems identified in their reports been successfully addressed?

Conclusion

- 5.65 In this study, we have summarized the main ways in which environmental monitoring systems are used, described the active Canadian federal monitoring systems, documented the key challenges associated with environmental monitoring, and highlighted good practices for monitoring in other jurisdictions.
- 5.66 Outside the federal government, many people and organizations use environmental monitoring results to manage the environment and the ways Canadians interact with it. They include health professionals, planners, emergency responders, resource managers, and major industries.
- **5.67** Within the federal government, environmental monitoring generates the information essential for
 - designing environmental management programs,
 - · allocating resources efficiently,
 - assessing the environmental effects of past and present projects,
 - evaluating compliance with environmental regulations,
 - promptly identifying problems, and
 - complementing scientific research.
- **5.68** Monitoring helps determine baselines against which targets can be set and progress can be evaluated. Information from monitoring can be combined with other information to assess the current state of the environment and to predict its future state.
- 5.69 To give Parliament a clearer picture of the environmental monitoring conducted by the federal government, we have prepared an inventory of 94 federal monitoring systems. Among other things, the inventory shows that there are more monitoring systems for plants and animals than other components of the environment. Environment Canada has the widest range and largest number of monitoring systems of any department or agency. This is a reflection of its responsibilities, which include monitoring weather, air, and water; managing toxic substances; and tracking bird populations.
- **5.70** We identified some of the main challenges that managers need to meet when putting in place monitoring systems:
 - coordinating, including establishing objectives and a strategic direction, and clarifying roles and responsibilities;

- building in quality at every step of monitoring;
- · preparing reports that contain useful information; and
- using the available resources efficiently.
- **5.71** Practices from other jurisdictions suggest possible ways of meeting some of these challenges in the Canadian context. Our identification of the main challenges and good practices will serve as a basis for criteria in future audits that examine how the federal government conducts environmental monitoring.
- 5.72 Environmental monitoring systems are like the systems that take the pulse of our economy: they both provide information to support a very wide variety of uses. Environmental monitoring information helps us deal with questions ranging from the mundane ("Do I need to take an umbrella today?") to the globally significant ("How quickly is the Arctic ice cap melting, and how will this affect the animals and people living in the North and other parts of Canada?"). In this study, we have tried to provide Parliament with some of the essential information it needs about the role of environmental monitoring systems and the challenges the federal government faces in managing such systems.

About the Study

Objectives

The overall objective of this study is to document the key challenges associated with environmental monitoring, describe the active Canadian federal monitoring systems, and highlight good practices for monitoring in other jurisdictions.

There are four sub-objectives:

- · to describe environmental monitoring and its role in environmental management;
- to prepare an inventory of active federal environmental monitoring systems and document the main properties of these systems;
- · to describe the key challenges for environmental monitoring systems; and
- to identify and document good practices in responding to the key challenges, drawing on the experience of other countries and other jurisdictions in Canada.

We did not establish criteria, because this is a study, not an audit.

Scope and approach

We studied the environmental monitoring systems that have been used by the following 11 entities:

- · Aboriginal Affairs and Northern Development Canada
- · Agriculture and Agri-Food Canada
- · Canadian Food Inspection Agency
- · Canadian Space Agency
- · Environment Canada
- Fisheries and Oceans Canada
- Health Canada
- · Natural Resources Canada
- · Parks Canada
- Public Health Agency of Canada
- Statistics Canada

Based on preliminary work, we determined that these were the main entities responsible for monitoring the state of the environment. We interviewed officials from these organizations and obtained documents describing their monitoring systems. The responsibilities for monitoring systems are shared by different parts of these departments and agencies.

We sent a questionnaire to all of the departments and agencies listed. We used the results to prepare an inventory of active federal monitoring systems that collect information related to the state of the environment. Our study focused mainly on the past two fiscal years, especially for the purpose of providing a snapshot of current monitoring systems. We also provided a brief historical perspective and drew on other information related to federal monitoring systems. The Appendix gives details of the inventory.

As part of the study, we assembled a committee of experts from the departments and agencies concerned. The committee provided valuable input and advice.

To better understand common challenges and good practices, we interviewed other Canadian and international experts, and reviewed the relevant literature. This included past observations and recommendations by the Office of the Auditor General of Canada and provincial counterparts. We did not, however, follow up on our past recommendations to determine what progress had been made.

We also interviewed officials from selected organizations in other countries. These included the

- · Danish Environmental Protection Agency,
- European Environment Agency,
- · Swedish Environmental Protection Agency,
- · United Kingdom Department for Environment, Food and Rural Affairs,
- United Kingdom Environment Agency,
- US Environmental Protection Agency,
- · US Fish and Wildlife Service, and
- US Geological Survey.

We made our selection from organizations in countries that are recognized leaders and that have legislative systems and issues relevant to Canada's. We spoke with officials of the national audit offices in each of the countries to ensure that we had a good understanding of the context for the interviews.

Period covered by the study

This study focuses on federal environmental monitoring systems that were in place during the 2009–10 or 2010–11 fiscal year. Some information from outside this period has been used as background.

Work for this chapter was substantially completed on 31 July 2011.

Study team

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Amélie Beaupré-Moreau

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For information, please contact Communications at 613-995-3708 or 1-888-761-5953 (toll-free).

Appendix Inventory of federal environmental monitoring systems

Our inventory of environmental monitoring systems lists active federal systems. By "environmental monitoring system," we mean a system that combines the processes for obtaining, assembling, synthesizing, and reporting repeated and systematic measurements or observations of environmental characteristics.

By "observations of environmental characteristics," we mean observations related to the different components of the environment: air, water, land (soil and landforms), plants and animals (including human beings), and ecosystems. We excluded human structures, such as those in the urban environment. We also excluded farmed and domestic animals. Contaminants affecting these components of the environment were taken into account when measured directly in the environment.

By "active system," we mean a system for which the entity managed the data collection in the 2009–10 or 2010–11 fiscal year. By "federal," we mean a system in which the federal government had some responsibility for ongoing operations. If the federal government simply provided funding but gave no direction, we excluded the system from this inventory.

For the purpose of this inventory, we focused on the state of the environment monitoring; we excluded compliance monitoring and monitoring related to individual projects (such as in relation to the assessment of environmental effects). This means, for example, that we excluded monitoring programs for contaminated sites. In addition, we excluded monitoring systems managed by other jurisdictions, where the federal government was only a user of the data.

The inventory focuses on national or major regional monitoring systems (for example, systems monitoring the Great Lakes). In some cases we included monitoring systems with a more restricted scope if they were part of a cluster of similar monitoring systems: that is, if the same approach was applied in different locations. We also used clusters if there were several very similar monitoring systems using the same methods. For instance, there are about 190 monitoring systems that track bird populations; we combined them into four clusters. Similarly, there are several monitoring systems that track aspects of ocean ecosystems; we grouped them by theme for each ocean. We also listed the set of monitoring systems for Canada's 42 national parks as a single monitoring system. We developed these clusters through discussion with the entities regarding the best way to present the monitoring information for our inventory. Of course there are various possible ways of grouping monitoring systems, given their similarities and the links among them.

We also restricted the inventory to systems where the federal government obtains measurements of the environment or of materials previously released into the environment (toxic substances, for example). The inventory excluded situations where the federal government used calculations from other information to estimate releases or environmental conditions. (The inventory excluded, for example, examination of the greenhouse gas emissions inventory and the National Agri-environmental Health Analysis and Reporting Program.) We also excluded samples collected only once, such as soil samples to characterize the soil in a particular location.

We used a questionnaire to obtain details about the monitoring systems in the inventory. We chose the questions to obtain basic and standard factual information about the systems. We pilot-tested the questions internally in the Office of the Auditor General of Canada and with departmental officials.

Even with the tested design of the questionnaire and the definitions of the monitoring systems to be included, several judgments were required about which systems to include and how best to represent them in the inventory. We discussed these judgments with the respondents to ensure the most consistent set of responses possible.

We entered responses to the questionnaire into a spreadsheet containing all of the information supplied. In addition, respondents provided background documents that gave further details about their monitoring programs.

We performed several checks to ensure that the inventory was as complete as possible. These included comparisons with other partial inventories and consultation with entity officials. As a final check on completeness, we asked the deputy head of each department or agency included in the study to identify any major monitoring systems that we had omitted.

The following table lists the monitoring systems (or clusters of monitoring systems) we identified through this process.

Monitoring system name and description	Lead department or agency
Air and atmosphere	
National Air Pollution Surveillance Network	Environment Canada
In collaboration with provinces and territories, provides accurate and long-term data of a uniform standard across Canada regarding key air pollutants, including ground-level ozone, particulate matter (fine particles in the atmosphere), and nitrogen oxides.	
Canadian Air and Precipitation Monitoring Network	Environment Canada
Studies the regional patterns and trends of atmospheric pollutants, such as acid rain, smog, particulate matter, and mercury, in both air and precipitation.	
Global Atmospheric Passive Sampling Network	Environment Canada
Determines spatial and temporal trends of persistent organic pollutants, identifies new chemicals in air, and helps assess long-range atmospheric transport.	
Integrated Atmospheric Deposition Network	Environment Canada
Monitors trends in toxic pollutants from non-point sources in the air and precipitation in the Great Lakes Basin. (Non-point sources are usually small, diffuse sources, such as runoff from agricultural land.)	
Intercontinental Atmospheric Transport of Anthropogenic Pollutants to the Arctic	Environment Canada
Monitors persistent organic pollutants and mercury in the Arctic air.	
Atmospheric Greenhouse Gas Measurement Program	Environment Canada
Identifies trends, seasonal variability, and spatial distribution of greenhouse gases and related gases in the atmosphere.	
Canadian Aerosol Baseline Measurements Program	Environment Canada
Tracks changes in aerosol (fine particles) composition and concentration in relation to changes in climate, anthropogenic emissions, and changes in natural sources and atmospheric transport patterns.	

Monitoring system name and description	Lead department or agency	
AEROCAN	Environment Canada	
Provides a sample of aerosols in the air column. The sample is as representative as possible of national, regional, and local variation across Canada, and contributes to the long-term record of particulate matter in the atmosphere.		
Canadian Operational Research Aerosol Lidar Network	Environment Canada	
Monitors long-range transport of aerosols that occur naturally (for example, as a result of volcanic venting or eruptions, dust storms, forest and grassland fires) or are caused by numan activities, such as the burning of fossil fuels.		
Canadian Ozonesonde Network	Environment Canada	
Provides regular measurements of ozone concentration from ground level up to an altitude of approximately 36 kilometres.		
Canadian Brewer Spectrophotometer Network	Environment Canada	
Monitors the recovery of the stratospheric ozone layer by measuring total column ozone, sulphur dioxide, and ultraviolet radiation in the atmosphere.		
Surface Weather and Climate Monitoring Network	Environment Canada	
Provides real-time data to weather offices for weather warnings and forecasts, and provides a long-term record of surface climate conditions.		
Jpper Air Network	Environment Canada	
Provides a profile of the upper atmosphere, including temperature, humidity, pressure, and winds. Contributes to weather forecasts.		
Space-based Monitoring Network (Geostationary and Polar Orbiting Sub-networks)	Environment Canada	
Provides satellite images, which are used by meteorologists to determine atmospheric, land, and ocean characteristics. Images are also used for environmental emergencies.		
National Radar Network	Environment Canada	
Monitors precipitation, thunderstorms, and high-impact weather. Can also detect birds and insects on clear days.		
Aircraft Meteorological Data Relay Program	Environment Canada	
Uses commercial aircraft to collect data from the upper atmosphere regarding wind, temperature, and pressure altitude.		
Meteorological Service of Canada—Marine Monitoring Network	Environment Canada	
Provides real-time measurements of weather and the state of the sea, from coastal and Arctic regions of Canada (including the Great Lakes and other large interior lakes, such as Lake Winnipeg and Great Slave Lake). These measurements support weather predictions and contribute to marine safety.		
Canadian Lightning Detection Network	Environment Canada	
Detects lightning activity.		
Drought Watch Website	Agriculture and Agri-Food Canada	
Provides near-real-time information about drought or excessive moisture and flood risks in agricultural areas, based on Environment Canada's meteorological data and provincial networks.		

Monitoring system name and description	Lead department or agency	
Comprehensive Nuclear Test-Ban Treaty Radiological Network	Health Canada	
Monitors radioactive compounds in the atmosphere to detect nuclear tests.		
Water		
Fresh Water Quality Monitoring Program	Environment Canada	
Monitors the status of water quality in Canada's rivers and lakes, as well as changes to aquatic ecosystem health.		
Freshwater Inventory and Surveillance of Mercury	Environment Canada	
Monitors spatial and temporal trends in fish mercury concentrations across Canada to assess the effectiveness of the Clean Air Regulatory Agenda mercury emission regulations.		
Canadian Aquatic Biomonitoring Network	Environment Canada	
Assesses freshwater quality and aquatic ecosystem conditions in Canada, using communities of large bottom-dwelling invertebrates.		
Acid Rain Aquatic Effects Monitoring Program	Environment Canada	
Monitors water chemistry of lakes (and a few streams) to establish the current regional acidification status, trends in acidification, and causes of the trends detected.		
National Hydrometric Program	Environment Canada	
Provides for the collection, interpretation, and dissemination of both real-time and historical surface water level and flow data.		
Sea and Lake Ice Monitoring Program	Environment Canada	
Monitors freshwater ice and sea ice conditions to provide information on stage of development, drift, and overall extent of the ice.		
Ceberg Monitoring Program	Environment Canada	
Monitors icebergs along Canada's east coast, south of latitude 60 degrees north.		
Integrated Satellite Tracking of Pollution	Environment Canada	
Uses satellites to monitor the marine environment for the accidental or intentional dumping of oily waste products.		
Snow Cover Mapping System	Natural Resources Canada	
Maps daily snow cover over Canada and in watersheds adjacent to Canadian territory.		
National Glacier-Climate Observing System	Natural Resources Canada	
Quantifies, and detects trends and other changes to, the mass balance and extent of Canada's land ice (glaciers and ice caps).		
mpact of Agriculture on Water Quality	Agriculture and Agri-Food Canada	
Evaluates the risk of fecal pollution of water from agriculture, versus other sources, and evaluates the efficacy of agricultural management practices.		
Orinking Water Monitoring System	Health Canada	
Measures the presence and levels of a variety of contaminants in raw and treated drinking vater at 65 treatment plants across Canada.		

Monitoring system name and description	Lead department or agency
Marine Environmental Quality—Atlantic	Fisheries and Oceans Canada
Monitors marine environmental quality (including contaminants) in sediments, biota, and the water column, as well as toxic algal blooms.	
Marine Environmental Quality—Pacific	Fisheries and Oceans Canada
Monitors marine environmental quality (including contaminants) in sediments, biota, and the water column, as well as toxic algal blooms.	
Freshwater Environmental Quality	Fisheries and Oceans Canada
For a set of lakes in Ontario, conducts monitoring with a focus on ecosystem stresses, including lake acidification and eutrophication (the buildup of nutrients in a water body, leading to excessive plant growth).	
Physical and Chemical Environment (including Greenhouse Gases)—Atlantic	Fisheries and Oceans Canada
Measures the hydrographic, physical, and chemical state of the marine ecosystem, including waves, winds, currents, tides, sea level, ice coverage and movement, temperature, salinity, oxygen, macronutrients, and surface chlorophyll. This includes the components of the carbon cycle as well as other climate-related chemicals.	
Physical and Chemical Environment—Pacific	Fisheries and Oceans Canada
Measures the hydrographic, physical, and chemical state of the marine ecosystem, including waves, winds, currents, tides, sea level, ice coverage and movement, temperature, salinity, oxygen, macronutrients, and surface chlorophyll.	
Physical and Chemical Monitoring (including Greenhouse Gases)—Arctic	Fisheries and Oceans Canada
Measures the hydrographic, physical, and chemical state of the marine ecosystem, including waves, winds, currents, tides, sea level, ice coverage and movement, temperature, salinity, oxygen, macronutrients, surface chlorophyll, and carbon.	
Greenhouse Gases—Pacific	Fisheries and Oceans Canada
Measures components of the carbon cycle, as well as other climate-related chemicals.	
Soil and landforms	
Canadian Permafrost Monitoring Network	Natural Resources Canada
Measures permafrost temperatures and the thickness of the active layer.	
Canadian National Seismograph Network	Natural Resources Canada
Monitors signals from seismic sources, including earthquakes and other possible sources (for example, nuclear tests and mining blasts).	
Ecological Long-term Plots Monitoring	Agriculture and Agri-Food Canada
Determines the long-term changes in soil productivity and health, water quality, and crop productivity in response to crop production and management practices.	
Contaminants in several components	
Chemicals Management Plan Monitoring and Surveillance	Environment Canada
Monitors chemical substances, including emerging chemicals of concern in air, water,	

Monitoring system name and description	Lead department or agency
Northern Contaminants Program	Aboriginal Affairs and Northern
Monitors concentrations of contaminants, including persistent organic pollutants and mercury, in air, wildlife, and human residents of the Canadian North.	Development Canada
First Nations Food Nutrition and Environment Study	Health Canada
Monitors the health status, traditional foods consumed, contaminants in traditional foods, contaminants in drinking water, pharmaceuticals in surface water, and mercury in hair of First Nations people in Canada.	
Colonial Water Bird Contaminant Program	Environment Canada
Monitors changes in contaminant concentrations in seabird eggs in the marine and Great Lakes environments over time.	
Plants and animals	
Acid Rain Biomonitoring Program	Environment Canada
Monitors the biological component of aquatic ecosystems in order to determine whether acid rain reduction efforts are sufficient to protect or enable the recovery of sensitive ecosystems across Canada.	
Monitoring Deforestation in Canada	Natural Resources Canada
Produces annual deforestation area estimates for Canada. Deforestation is defined as human-induced land use change from forest to non-forest.	
National Forest Inventory	Natural Resources Canada
Estimates change in Canada's forest ecosystems.	
Species at Risk Recovery Monitoring	Environment Canada
Monitors status of species at risk under the Species at Risk Act.	
Coastal Habitat Assessment and Monitoring Project	Environment Canada
Monitors marsh bird communities and their habitat in lower Great Lakes coastal wetlands.	
National Wildlife Area (NWA) and Migratory Bird Sanctuary (MBS) Monitoring Program	Environment Canada
Monitors, surveys, and tracks ecological integrity and species trends within NWA and MBS. Assesses habitat changes, effectiveness of NWA management prescriptions, species at risk, and bird populations.	
Annual Crop Inventory	Agriculture and Agri-Food Canada
dentifies and maps the crops grown in agricultural fields in Canada annually.	
National Crop Monitoring System	Agriculture and Agri-Food Canada
Provides weekly crop condition assessments for all of Canada south of latitude 60 degrees north.	
ower Trophic Levels—Water Column—Atlantic	Fisheries and Oceans Canada
Monitors organisms living in the water column, such as phytoplankton and zooplankton 13 different activities).	
ower Trophic Levels—Water Column—Pacific	Fisheries and Oceans Canada
Monitors organisms living in the water column, such as phytoplankton and zooplankton 9 different activities).	

Monitoring system name and description	Lead department or agency
Lower Trophic Levels—Benthos—Atlantic	Fisheries and Oceans Canada
Monitors organisms that live on, in, or near the seabed (27 different activities). These activities exclude monitoring fish and higher organisms.	
Lower Trophic Levels—Benthos—Pacific	Fisheries and Oceans Canada
Monitors organisms that live on, in, or near the seabed (14 different activities). These activities exclude monitoring fish and higher organisms.	
Higher Trophic Levels—Fish—Atlantic	Fisheries and Oceans Canada
Monitors fish populations, including their abundance, distribution, and biological data (38 different activities).	
Higher Trophic Levels—Fish—Pacific	Fisheries and Oceans Canada
Monitors fish populations, including their abundance, distribution, and biological data (21 different activities).	
Multi-Species Stock Assessment Surveys of Canadian Shrimp Fishing Areas in the Arctic	Fisheries and Oceans Canada
Monitors northern shrimp, striped shrimp, and Greenland halibut populations to assess the effects of fisheries on these species in the Arctic. Also monitors other species, as well as water temperature and salinity.	
Community-based Monitoring of Freshwater and Anadromous Fishes in the Western Arctic	Fisheries and Oceans Canada
Monitors populations of several related fish species (Dolly Varden, Arctic char, and lake trout) to assess the effects of fisheries on these species.	
Higher Trophic Levels—Marine Mammals—Atlantic	Fisheries and Oceans Canada
Measures abundance, distribution, contaminant exposure, genetics, and diet of marine mammals in the Atlantic (19 different activities).	
Higher Trophic Levels—Marine Mammals—Pacific	Fisheries and Oceans Canada
Measures abundance, distribution, contaminant exposure, genetics, and diet of marine mammals in the Pacific (6 different activities).	
Community-based Monitoring of Ice Seals—Arctic	Fisheries and Oceans Canada
Monitors changes associated with global warming in several species of seals, including changes in age/sex structure, diet, reproduction, survival, contaminants, and disease.	
Aquatic Animal Health—American Oyster Health Surveillance	Fisheries and Oceans Canada
Detects new occurrences of multinucleated sphere unknown parasitic disease, which can cause oyster mortality, and monitors any emerging diseases in oysters in the Atlantic.	
Aquatic Invasive Species—Atlantic	Fisheries and Oceans Canada
Focuses on the early detection and monitoring of biofouling aquatic invasive species and their spread in high-risk ecosystems. Also focuses on assessing and understanding ecosystems at various stages of aquatic invasive species infestation (3 different activities).	
Aquatic Invasive Species—Pacific	Fisheries and Oceans Canada
Detects new aquatic invasive species, and geographical spread of existing species (3_different activities).	

Monitoring system name and description	Lead department or agency	
Aquatic Invasive Species—Central and Arctic	Fisheries and Oceans Canada	
Monitors and provides early detection of aquatic invasive species in the Great Lakes, and establishes a baseline for aquatic invasive species monitoring in the Canadian Arctic (3 different activities).		
Canadian Shorebird Monitoring	Environment Canada	
Provides information on the current population status, distribution, and trends of shorebird species in Canada, including some monitoring in Latin America (about 15 different surveys for approximately 75 species).		
Canadian Landbird Monitoring	Environment Canada	
Provides information on the current population status, distribution, and trends of land bird species in Canada, largely relying on public volunteers (about 58 different surveys for approximately 250 species).		
Canadian Waterfowl Monitoring	Environment Canada	
Provides information on the current population status, distribution, and trends of waterfowl species in Canada, as well as the magnitude of harvest of game species (about 80 different surveys covering approximately 50 species).		
Canadian Waterbird Monitoring	Environment Canada	
Provides information on the current population status, distribution, and trends of waterbird species in Canada, including seabirds, inland colonial waterbirds, marsh birds, and others about 37 different surveys for approximately 90 species).	1	
Prairie Habitat Joint Venture Habitat Monitoring Program	Environment Canada	
Monitors wetland and upland status and trends in the Prairie Habitat Joint Venture area.		
Canadian Shellfish Sanitation Program	Canadian Food Inspection Agency	
Monitors shellfish (bivalve mollusc) harvest areas in Canada. Includes marine toxin nonitoring, ongoing water quality monitoring for fecal contamination in the shellfish-growing area, and identification of pollution sources.	with Environment Canada and Fisheries and Oceans Canada	
nteragency Wild Bird Influenza Survey	Canadian Food Inspection Agency	
Detects highly pathogenic strains of avian influenza early, identifies avian influenza viruses irculating in wild bird populations, and tracks genetic changes in the viruses over years.		
Plant Health Surveillance	Canadian Food Inspection Agency	
Monitors plant pests of quarantine significance, including invasive species.		
Vildlife Disease Monitoring	Environment Canada with Canadian	
Monitors different wildlife diseases in dead and live animals: West Nile virus, Lyme disease, white nose syndrome of bats, rabies, and others. (Avian influenza is listed separately in this aventory.) Monitoring is conducted by the Canadian Cooperative Wildlife Health Centre.	Food Inspection Agency, Public Health Agency of Canada, and oth federal partners	
cosystem processes		
and Cover Time Series of Canada	Natural Resources Canada	
Ises satellite observations to provide information on land cover and land cover change at the national scale.		

Monitoring system name and description	Lead department or agency
Fire Monitoring, Accounting and Reporting System	Natural Resources Canada
ntegrates annual burned area mapping with models of fire weather and behaviour and fire ecological effects, resulting in estimates of carbon emissions.	
Lake Ontario Coastal Wetland Vegetation Dynamics Monitoring	Environment Canada
Monitors vegetation communities and wildlife habitat in response to a new water level regulation plan for Lake Ontario.	
Human population	
Canadian Integrated Program for Antimicrobial Resistance Surveillance	Public Health Agency of Canada
Tracks temporal and regional trends in antimicrobial use, and antimicrobial resistance in selected species of enteric bacteria along the food chain and from human cases.	
National Integrated Enteric Pathogen Surveillance Program	Public Health Agency of Canada
Detects changes in trends in human enteric disease and in levels of pathogen exposure from food, animal, and water sources.	
Lyme Disease Surveillance System	Public Health Agency of Canada
For the information of the public and medical practitioners, identifies the geographic ocations where Lyme disease is emerging.	
West Nile Virus National Surveillance System	Public Health Agency of Canada
Provides data for the prevention and control of West Nile virus and reduction of the disease's impact on Canadians.	
First Nations Biomonitoring Initiative	Health Canada
Monitors First Nations people living on reserves to examine their current exposure to environmental chemicals or contaminants. The Assembly of First Nations is the custodian of the data.	
Canadian Health Measures Survey	Statistics Canada with Health
Collects key information relevant to the health of Canadians, including blood and urine samples, to test for chronic and infectious diseases, nutrition, and environmental markers.	Canada and the Public Health Agency of Canada
Other environmental components	
Ecological Integrity Monitoring System	Parks Canada
Monitors the ecological integrity of Canada's national parks by measuring, for each major park ecosystem, the biodiversity, ecosystem processes, and sources of stress at both local and landscape scales.	
Marine Protected Areas—Atlantic	Fisheries and Oceans Canada
Monitors the status and efficacy of marine protected areas in the Atlantic.	
Marine Protected Areas—Pacific	Fisheries and Oceans Canada
Monitors the status and efficacy of marine protected areas in the Pacific.	
Northwest Territories Cumulative Impact Monitoring Program	Aboriginal Affairs and Northern
Collects, analyzes, and synthesizes environmental information to provide cumulative effects information to decision makers.	Development Canada

Monitoring system name and description	Lead department or agency
Canadian Geomagnetic Observatory Network	Natural Resources Canada
Monitors the Earth's magnetic field and geomagnetic disturbances caused by space weather.	1
Canadian Radiological Monitoring Network System	Health Canada
Measures radioactivity levels in the environment locally, around major Canadian nuclear facilities, and more broadly across Canada, and collects precipitation and air samples to measure radioactive particulate matter and radioactivity doses.	
State of the St. Lawrence Monitoring Program	Environment Canada
Monitors and reports information on water, sediment, shorelines, biological resources, and uses of the St. Lawrence River.	



Report of the Commissioner of the Environment and Sustainable Development—December 2011

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2011



Report of the
Commissioner of the
Environment and
Sustainable Development

DECEMBER

Chapter 6
Environmental Petitions



Office of the Auditor General of Canada



2011



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Sustainable Development

DECEMBER

Chapter 6
Environmental Petitions





The December 2011 Report of the Commissioner of the Environment and Sustainable Development comprises
The Commissioner's Perspective, Main Points—Chapters 1 to 5, an appendix, and six chapters. The main table of contents
for the Report is found at the end of this publication.

The Report is available on our website at www.oag-bvg.gc.ca.

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Chapter

6

Environmental Petitions



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Introduction

Highlights

6.1 This annual report highlights some of the issues raised by Canadians in environmental petitions in the past year, including shale gas exploration and the labelling of products containing genetically modified organisms. In addition, the report summarizes ministers' performance in responding to petitions. We are pleased to note that Environment Canada, Health Canada, and Fisheries and Oceans Canada continued to have a 100 percent on-time response rate. However, we report that three departments addressed in one petition misinterpreted how economic aspects of environmental issues are an important part of sustainable development. We also report that six ministers of departments addressed in one petition did not provide a substantive response to what, in our view, represents an appropriate question in the petitions process. We believe that this approach to responding to petition questions does not acknowledge the objective of the petitions process, namely, to provide Canadians with an avenue to receive information pertaining to questions about environmental matters in the context of sustainable development.

The environmental petitions process

- through an amendment to the Auditor General Act. The process is a formal yet simple way for Canadians to obtain responses from federal ministers to their questions, concerns, and requests on environmental issues that are within the federal government's mandate. Twenty-seven departments and agencies are currently subject to the process. The Commissioner of the Environment and Sustainable Development administers the process on behalf of the Auditor General. The Commissioner also prepares an annual report on petitions and responses, covering the 12-month period from 1 July to 30 June of the following year.
- 6.3 Any Canadian resident may submit an environmental petition, acting alone or on behalf of an organization, business, or municipality. Since the launch of the process in 1995, the Office has received more than 380 petitions. Topics have varied widely, from the impact of a development on a local stream to the right of all Canadians to a healthy environment. Petitioners have used the petitions process to ask for information, investigations, specific actions, and policy changes.

The Office forwards a petition to the federal ministers responsible for the issues raised. The ministers must reply in writing to the petition within 120 calendar days. They are required to notify the petitioner before the end of this period if they do not expect to be able to meet the timeline. This is clearly specified in the Auditor General Act, which states that ministers must respond to each petition. While ministers must answer a petitioner's questions in a timely manner, this does not mean that ministers or departments are required to take action on the issues raised. However, the Act does not restrict departments from taking action. Exhibit 6.1 outlines the petitions process.

Exhibit 6.1 The environmental petitions process and the role of the Commissioner of the Environment and Sustainable Development

Environmental petitions process			
Starting a petition			
Reviewing a petition	The Commissioner reviews the petition to determine whether it meets the requirements of the Auditor General Act.		
	If the petition meets the requirements of the Auditor General Act, the Commissioner will determine the federal departments and agencies responsible for the issues addressed in the petition; send it to the responsible ministers; and send a letter to the petitioner, listing the ministers to whom the petition was sent.	If the petition does not meet the requirements of the Auditor General Act, the petitioner will be informed in writing. If the petition is incomplete or unclear, the petitioner will be asked to resubmit it.	
Responding to a petition	the petition; and	ust or and the Commissioner acknowledging receipt o petitioner and the Commissioner within 120 days	

Ongoing petitions activities				
Monitoring	Reporting	Posting on the Internet	Auditing	
The Commissioner monitors acknowledgement letters and responses from ministers.	The Commissioner reports to the House of Commons on the petitions and responses received.	The Commissioner posts petitions, responses, and summary information on the Internet, in both official languages.	The Office of the Auditor General considers issues raised in petitions when planning future audits.	

Source: Adapted from the Auditor General Act and Getting Answers: A Guide to the Environmental Petitions Process

Getting Answers—A Guide to the Environmental Petitions Process

The guide is available on the Office of the Auditor General website (www.oag-bvg.gc.ca).

- 6.5 To assist petitioners, the Office has produced Getting Answers—A Guide to the Environmental Petitions Process. The guide describes the process in more detail and includes information on
 - what kinds of requests can be made,
 - how to write and submit an environmental petition,
 - what the role of the Commissioner is, and
 - what petitioners can expect from departments and agencies.

Focus of the annual report

- 6.6 The purpose of this annual report is to inform Parliament and Canadians about the number, nature, and status of petitions and responses received between 1 July 2010 and 30 June 2011, as required by section 23 of the *Auditor General Act*. The report also highlights good practices and opportunities for improving the petitions process.
- **6.7** More details on our work are in **About the Annual Report** at the end of this chapter.

Petitions and Responses

Petitions received

- 6.8 During this year's reporting period (1 July 2010 to 30 June 2011), the Office of the Auditor General of Canada received 25 environmental petitions, compared with 18 last year and 28 the year before. The Appendix presents an overview of petitions activity during our reporting period, including petition summaries. After tabling the petitions in Parliament and with the consent of the petitioners, the Office posts the petitions and responses in the petitions catalogue on our website.
- 6.9 Members of the public frequently tell us that many Canadians wishing to submit environment-related questions to the federal government are unaware of the process for doing so. We made a similar observation in our October 2007 retrospective and annual report chapter. It is important to continue informing potential users about the petitions process as envisaged by Parliament. We will therefore continue to explore ways to broaden public awareness of the process, including the use of social media and other outreach efforts.

Using social media to explain environmental petitions

A video on the environmental petitions process is available on the OAG YouTube channel (http://www.youtube.com/user/OAGBVG). In addition, you can follow us on Twitter at CESD_CEDD.

Follow-up petition —A petition submitted after receiving the response to an initial petition. It can be submitted immediately to ask additional questions or to seek clarification, or in the future to determine the status of the issue and progress made by departments and agencies against any commitments made.

Endocrine disrupting chemicals—External agents that interfere with the production, release, transport, metabolism, binding, action or elimination of the natural hormones in the body responsible for the maintenance of internal equilibrium and the regulation of developmental processes.

Individuals and past petitioners submitted more than half the petitions

- **6.10** Petitioners residing in five provinces submitted petitions this year (Exhibit 6.2). More than 80 percent of the petitions originated in Quebec (11 petitions) and Ontario (10 petitions). Residents of Manitoba, British Columbia, and New Brunswick also submitted petitions.
- **6.11** Individuals submitted 13 (half) of this year's 25 petitions. The remaining petitions came from various groups, including community associations and environmental organizations. Past petitioners submitted 14 petitions, a little more than half of this year's total; 8 of the 14 were follow-up petitions.

The issues most commonly raised by petitioners concerned environmental assessment, compliance and enforcement, health, and toxic substances

- 6.12 This year's petitions dealt with 19 different topics, a continuation of the diversity of past years. Topics included regulating Canadian mining operations abroad (Petition 304), labelling for genetically modified organisms (Petition 305), use of endocrine disrupting chemicals in cosmetics (Petition 310), construction of a security fence at a Canadian Forces base (Petition 313), and use of toxic chemicals to control sea lice (Petition 318).
- 6.13 New topics raised in more than one petition this year included the potential environmental impact of hydro projects on First Nations lands and waterways in Manitoba (petitions 302 and 302B), and concerns about an alleged discharge of sewage sludge into the St. Lawrence River near the municipality of L'Isle-Verte, Quebec (petitions 303 and 303B).
- **6.14** There were also follow-up petitions on topics raised in the previous year. We received two more petitions concerning the regulation and approval of fluoridation products added to drinking water (petitions 299B and 299C), as well as two additional petitions on the alleged misinterpretation of exclusion list conditions under the *Canadian Environmental Assessment Act*, related to the construction of a communications tower in Pontiac, Quebec (petitions 301B and 301C).
- 6.15 Three of this year's petitions focused on shale gas exploration and extraction in Quebec. This is an emerging environmental issue, not only in Canada but globally as well. Extraction requires the injection of potentially toxic chemicals under high pressure into shale formations containing natural gas—a process known as hydraulic

Exhibit 6.2 Petitions came from five provinces (1 July 2010 to 30 June 2011)



Petition No.	Topic	Petition No.	Торіс
122E	Follow-up petition on a housing development near Mission, British Columbia	306	Regulation of biosolid-based fertilizers under the Fertilizers Act
240D	Follow-up petition on environmental concerns regarding the Cacouna marsh	307	The federal government's role in regulating shale gas exploration in Quebec
299B	Follow-up petition on the regulation and approval of fluoridation products added to drinking water	308	Federal government responsibilities for shale gas extraction in Quebec
299C	Follow-up petition on the regulation and approval of fluoridation products added to drinking water	309	Construction of a hotel in a wetland area near the Ottawa International Airport
301B	Follow-up petition on the alleged misinterpretation of exclusion list conditions under the <i>Canadian</i>	310	Health and environmental impact of endocrine disrupting chemicals used in cosmetics
	Environmental Assessment Act, related to the construction of a communications tower in Pontiac, Quebec	311	Abandonment of the <i>Migratory Birds Convention Act</i> incidental take regulatory initiative
301C	Follow-up petition on the alleged misinterpretation of exclusion list conditions under the <i>Canadian</i>	312	Federal funding for road construction in a designated flood plain in Ottawa, Ontario
	Environmental Assessment Act, related to the construction of a communications tower in Pontiac, Quebec	313	Concerns about the environmental assessment for the construction of a security fence at Canadian Forces Base Kingston in Ontario
302	Potential environmental impact of hydro projects on First Nations lands and waterways in Manitoba	314	Concerns about the adequacy of environmental assessment for the construction of a sports dome on
302B	Follow-up petition on the potential environmental impact		National Defence property in Kingston, Ontario
	of hydro projects on First Nations lands and waterways in Manitoba	315	Environmental assessment of a project on federal wetlands located in the Greenbelt near the Ottawa
303	Alleged discharge of sewage sludge into the St. Lawrence River near the municipality of L'Isle-Verte, Quebec		International Airport
303B	Follow-up petition on an alleged discharge of sewage	316	Environmental risks related to asphalt waste allegedly dumped in Wainfleet, Ontario
	sludge into the St. Lawrence River near the municipality of L'Isle-Verte, Quebec	317	National Pollutant Release Inventory reporting of chemicals used for shale gas and in-situ mining
304	Federal regulation of Canadian mining companies operating in Canada and abroad	318	Use of toxic chemicals to control sea lice at salmon aquaculture sites in New Brunswick
305	Accountability for labelling of genetically modified organisms		

Source: Petitions submitted to the Auditor General of Canada. Summaries appear in the Appendix.

fracturing, or fracking. The individuals who submitted petitions 307 and 308 recognized that the federal and provincial governments share responsibility for environmental protection. The petitioners asked the federal government to explain its environmental protection role, as well as how its responsibilities could be applied in this area and how shared responsibility is managed. Shale gas was also referred to in Petition 317, which deals in part with disclosing in the National Pollutant Release Inventory the fracking chemicals used in shale gas extraction. We also received two petitions about the environmental assessment of a hotel and convention centre being built on federal lands near the Ottawa Airport (petitions 309 and 315).

- **6.16** When petitions are received, we review them to identify the issues (categories) that apply to them. To help web users with their searches, our online catalogue lists petitions by number, responding federal institution, and issue.
- 6.17 Based on our review, the issues identified most frequently in petitions this year were the following:
 - Environmental assessment was the most common issue. Most of the petitions dealing with this issue related to assessments of specific projects, such as road construction in a designated flood plain (Petition 312) or a sports dome being built on federal land (Petition 314).
 - Compliance and enforcement was another issue frequently raised in petitions. Petition 311 questioned whether Environment Canada's abandonment of a regulatory initiative for migratory birds complies with a decision under the North American Agreement on Environmental Cooperation, while petitions 303 and 303B asked whether the alleged discharge of sewage sludge into the St. Lawrence River complies with the Fisheries Act and other federal legislation.
 - · Health and toxic substances were other issues commonly raised in petitions.

Because environmental issues tend to be interrelated and can affect a number of areas, we normally identify more than one issue category for each petition. For example, in the petitions about fluoride in drinking water (Petitions 299B and 299C), the focus is the potential impact of environmental issues on health, but they also deal with issues related to water and toxic substances. The petition about labelling of genetically modified organisms connects health impacts with another environmental issue, such as agriculture (Petition 305).

North American Agreement on Environmental Cooperation—An (NAFTA). This environmental agreement came effective enforcement of environmental laws.

- 6.18 Among petitions that deal with different topics and issues, there are often common themes. The most common theme this year was due process, with petitioners expressing concern about the way the federal government applied its policies and procedures. This concern was raised particularly in petitions that dealt primarily with environmental assessment; the petitioners asked questions about the extent of public consultation, the interpretation of assessment criteria, and the full consideration of all potential issues.
- 6.19 For example, Petition 302 asked about how the federal government consulted with First Nations when carrying out its environmental assessment responsibilities related to hydroelectric projects in Manitoba. The two follow-up petitions to Petition 301 asked about how Industry Canada interprets the criteria for the surface area of a project when determining whether a communications tower is exempt from environmental assessment. Petitions 313 and 314 asked National Defence whether its assessments of two projects in Kingston, Ontario, considered all potential issues, including environmental, cultural, and historical issues.
- 6.20 Since the federal and provincial governments share responsibility for the environment, a number of petitions focused on the gaps and overlaps between the two levels of government. This theme was particularly prominent in two of the petitions dealing with shale gas exploration and development in Quebec. The petitions asked the federal government to explain its role and responsibilities for environmental protection. Other petitions asked about the extent of federal responsibility for particular issues, such as an alleged discharge of sewage sludge into the St. Lawrence River near L'Isle-Verte, Quebec (Petition 303) or an alleged dumping of waste asphalt in Wainfleet, Ontario (Petition 316).

The majority of petitions dealt with local or regional issues

6.21 This year, the majority of petitions (15) focused on local, regional, or case-specific issues, such as the environmental assessment of a housing development near Mission, British Columbia (Petition 122E), the alleged dumping of asphalt waste in Wainfleet, Ontario (Petition 316), and the control of sea lice at salmon aquaculture sites in New Brunswick (Petition 318). Eight petitions dealt with largely national or broad issues, such as the use of endocrine disrupting chemicals in cosmetics (Petition 310) or the regulation of biosolid-based fertilizers (Petition 306). Two follow-up petitions (301B and 301C) contained a mix of local and

national issues. They used the example of a local case to raise broader questions about the federal government's interpretation of exclusion list conditions under federal environmental assessment legislation.

The petitions guide is designed to help petitioners produce concise petitions

6.22 We continue to encourage petitioners to submit concise petitions because we believe that petition length does not necessarily correlate with the importance of the issue, the knowledge of the petitioners, or the length or detail of the response. Consequently, in our petitions guide (Getting Answers—A Guide to the Environmental Petitions Process), we suggest a maximum of 5,000 words and no more than 20 questions or requests. We also state that the Office reserves the right to not publish petitions exceeding those limits on its website. Petitions received this year met these guidelines, containing on average 2,500 words and 11 questions.

Responses received

- The Auditor General Act requires responsible ministers to consider each petition and reply in writing within 120 calendar days after a petition is received. As a result, some of the responses covered in this report were for petitions received in the previous reporting period. This accounts for the difference in the number of petitions submitted (25) and the number of petitions for which responses were due this year (19, which includes 3 petitions from the previous year). Responses for the 9 petitions received toward the end of this reporting period will appear in next year's report.
- 6.24 Also, since most petitions were directed to more than one responsible minister, 13 departments and agencies provided a total of 62 responses to the 19 petitions for which responses were due this year. Environment Canada typically ranks first in the number of petitions received; this year it responded to 16 of the 19 petitions. Health Canada ranked second, responding to 11 petitions.

The percentage of on-time responses remained stable

- 6.25 This year, 92 percent of responses were on time. This is comparable to last year's on-time response rate of 93 percent and significantly higher than the previous year's rate of 77 percent.
- **6.26** We are pleased to note that 10 departments provided all of their responses on time this year, including the 3 departments responsible for the largest number of responses—Environment Canada (16), Health Canada (11), and Fisheries and Oceans Canada (9). This is the second straight year that 100 percent of responses from Environment

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Canada were on time, and the third year for both Health Canada and Fisheries and Oceans Canada.

- 6.27 This year, three departments responded late to at least one petition. They included Industry Canada, which responded late to the three petitions for which it was responsible (Exhibit 6.3).
- 6.28 Responses received after the 120-day deadline were 19 days late on average. The performance declined from last year's 9-day average, largely because Industry Canada was late an average of 29 days for the three petitions it was responsible for this year. As of 30 June 2011, National Defence was 6 days late in responding to Petition 313. It replied in early September.
- **6.29** Although departments and agencies have a statutory obligation to respond within 120 days, the response is not considered to be late if the responsible minister sends a written notification of delay within this period. No notifications of delay were sent this year.

Exhibit 6.3 Three departments responded late to at least one petition

Department	Number of responses due	Number of late responses	Percentage on time (%)	Notifications of delay*
Aboriginal Affairs and Northern Development Canada (formerly Indian and Northern Affairs Canada)	2	1	50	0
Agriculture and Agri-Food Canada	4	0	100	0
Canadian Heritage	1	0	100	0
Environment Canada	16	0	100	0
Fisheries and Oceans Canada	9	0	100	0
Foreign Affairs and International Trade Canada	3	0	100	0
Health Canada	11	0	100	0
Industry Canada	3	3	0	0
Justice Canada, Department of	4	0	100	0
National Defence	1	1	0	0
Natural Resources Canada	4	0	100	0
Public Works and Government Services Canada	1	0	100	0
Transport Canada	3	0	100	0
Totals	62	5	92	0

^{*} A response is not considered to be late if the petitioner is notified of an expected delay before the due date.

Most responses were complete and relevant

- 6.30 The 19 petitions that departments responded to this year contained about 230 questions. Questions and responses varied considerably in length and level of detail. Exhibit 6.4 provides examples of types of questions and responses.
- **6.31** As part of its monitoring role, the petitions team routinely reviews each petition response, including determining the potential relevance to planned audits. We have two primary considerations in our reviews:
 - Completeness. Is every question addressed?
 - Relevance. Are the responses relevant to the questions?
- **6.32** We also look for clarity in responses. For example, if the responding department disagrees with information or views that are central to the petition, we consider whether its response includes a clear explanation of the reason for the disagreement. This is the type of observation we may raise with departments when we meet periodically to discuss the petitions process.
- **6.33** Petition responses reflect the government's policy and program objectives and the responding departments' implementation and management of these objectives, which may not align with the views of petitioners.
- **6.34** As in past years, this year we found that the majority of responses were complete and relevant. Moreover, some petition responses included considerable depth and detail—for example, the responses to petitions 300 and 310.
 - Response to Petition 300. In this petition received in 2009–10, the petitioner asked the federal government about the potential impact of salmon aquaculture on fish habitats and fisheries, as well as other species. During the current year, Fisheries and Oceans Canada provided a detailed response, including statistics drawn from numerous federal and provincial studies and programs. The Department also supplied a list of research studies related to sea lice treatment.
 - Response to Petition 310. The petitioner asked the federal government about the potential human and environmental health impacts of endocrine disrupting chemicals used in cosmetics. In its response, Health Canada provided detailed and understandable information on its work in this area, including its risk assessment processes and its categorization of endocrine disrupting chemicals.

The Department also indicated which chemicals are being used in cosmetics according to its Cosmetic Notification System.

- **6.35** In responding this year to Petition 301 (Alleged misinterpretation of exclusion list conditions under the *Canadian Environmental Assessment Act*, related to the construction of a communications tower in Pontiac, Quebec), which was received in 2009–10, Environment Canada did not answer two of the petitioner's questions. We notified the Department of the omission and the Minister subsequently provided the missing answers.
- **6.36** As in previous years, Fisheries and Oceans Canada, in the majority of its responses, continued to provide petitioners with the names and telephone numbers of departmental contacts in case the petitioners require additional information. This good practice demonstrates openness and transparency. We encourage other departments and agencies to adopt a similar approach.

Ministers did not provide substantive responses to some questions posed by petitioners

- 6.37 Although we found that most responses were complete and relevant, we noted that the responsible federal ministers did not provide substantive responses to petitioners' questions in two petitions—Petition 302 (Potential environmental impact of hydro projects on First Nations lands and waterways in Manitoba) and Petition 308 (Federal government responsibilities for shale gas extraction in Quebec).
- **6.38** Petition 302, economic aspects of environmental issues. In this petition, received in August 2010, the petitioner expressed concerns about the potential environmental impact of hydro projects on First Nations lands and waterways in Manitoba. In addition, the petitioner asked federal departments to "advise as to the economic losses that Canada agrees were sustained by all Affiliated First Nations as a result of the described impacts and operations by proposed projects and MB [Manitoba] Hydro."
- **6.39** In their responses dated January 2011, the Minister of Indian and Northern Affairs, the Minister of the Environment, and the Minister of Transport all replied, "The discussion of the existence or quantification of alleged economic losses in relation to environmental issues is not properly within the scope of an environmental petition under the *Auditor General Act*." We do not agree with this interpretation.

Exhibit 6.4 Petitioners' questions and the answers they receive vary considerably in length and level of detail

Question	Response
Petition 300*, Question 11. Will DFO [Fisheries and Oceans Canada] or any responsible agency state the number and potential value of lobsters known to have been lost in Passamaquoddy because of chemicals used at salmon cages?	Fisheries and Oceans Canada's response. The only confirmed loss of lobsters was in December 2009. A lobster harvester reported that of 14 crates of lobster stored in the harbour near Fairhaven, Deer Island, 725 pounds of the lobster were dead when hauled out of the water. It has been confirmed that an illegal chemical known as Cypermethrin was deposited in the marine environment and traces of Cypermethrin [were] found in lobsters from [the] Deer Island area. Environment Canada has launched an investigation into this event as Cypermethrin is not authorized for use in Canada in the marine environment. The source of the illegal chemicals is still being investigated.
Petition 122E, Question 3. Did DFO authorize clearing of the peninsula to 15 metres from Silvermere Lake or did Genstar clear the riparian area without a 35(2) authorization from DFO? If no authorization was given, why have charges not been laid under the <i>Fisheries Act</i> and reparations not required for the loss of this habitat?	Fisheries and Oceans Canada's response. DFO did not authorize the clearing of the peninsula to 15 metres from Silvermere Lake. The decision to lay charges is a discretionary one. A number of factors are considered. In this particular case, DFO decided not to lay charges. DFO expects any required reparations to be addressed through the development planning process.
Petition 305, Question 2. How is Health Canada, Agriculture and Agri-Food Canada, Environment Canada, or any other responsible department monitoring the use of the current voluntary standards?	Agriculture and Agri-Food Canada's response. Health Canada is responsible for setting food labelling policies with respect to health and safety matters, for example, nutritional content and special dietary needs. This applies to all foods, including foods that have been derived through genetic engineering. The CFIA [Canadian Food Inspection Agency] is responsible for the development of non-health and safety food labelling regulations and policies and for the enforcement of both the health and safety and non-health and safety requirements.
	Food label and advertising claims pertaining to the use or non-use of genetic engineering are permissible in Canada, provided such claims are truthful; not misleading; not deceptive; not likely to create an erroneous impression of a food's character, value, composition, merit or safety; and in compliance with all other regulatory requirements.
	The CGSB [Canadian General Standards Board] standard entitled Voluntary Labelling and Advertising of Foods that Are and Are Not Products of Genetic Engineering is used by the CFIA to help companies comply with the laws that prevent false and misleading representations about the method-of-production claims on their foods.
	Provided that the requirements outlined in the above two paragraphs are met, it is up to individual businesses to decide whether they wish to make claims through the use of the voluntary standard; the Government of Canada does not play a role in tracking these decisions.
	Compliance monitoring is conducted to verify that activities regulated by the CFIA are carried out in accordance with the provisions of those acts and regulations administered and enforced by the CFIA. Compliance monitoring will take into account any risks to health and safety and the protection of consumers and market access. Compliance monitoring methods include inspection visits, audits and other verification measures; reporting of information in accordance with requirements under the acts and regulations, including the requirement to keep records, such as Hazard Analysis Critical Control Point and other quality assurance programs; sampling, testing, laboratory analysis and examination of documents; and inspection of products regulated by the CFIA. Delivery of these services is conducted by close to 7,000 employees working across Canada.

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Exhibit 6.4 Petitioners' questions and the answers they receive vary considerably in length and level of detail (continued)

Question	Response
Petition 301B, Question 11. Does the Canadian Environmental Assessment Agency maintain a database that includes antenna system projects that have been excluded from environmental assessment under the Canadian Environmental Assessment Act?	Environment Canada's response. The Canadian Environmental Assessment Agency does not maintain a database of projects that have been excluded from environmental assessment under the Canadian Environmental Assessment Act. The Act clearly sets out the responsibilities of both federal authorities and the Agency with respect to the conduct of environmental assessments as well as the maintenance of records. Neither is required to maintain a database of excluded projects.
Petition 310, Question 2. How does Health Canada interpret and enforce the general prohibition in section 16(a) of the Food and Drugs Act with respect to endocrine disrupting chemicals? In assessing the potential of a substance to cause injury, does Health Canada consider long-term aggregate and cumulative exposures, and transgenerational effects? Please supply any relevant policy or guidelines.	Health Canada's response. Under section 16 of the Food and Drugs Act, no person shall sell any cosmetic that contains any substance that may cause injury to the health of the user when the cosmetic is used according to the directions on the label, and under normal use. If any ingredients are found to present a risk to consumers, especially vulnerable populations such as children, Health Canada will act quickly to prohibit or restrict the use of these ingredients. Endocrine disruption is but one potential mechanism of toxicity, and all toxic effects are considered in the assessment of risk. Health Canada takes a risk-based approach with regard to regulating cosmetics. This approach involves the review of scientific literature, including information on acute, short-term, sub-chronic, and chronic exposures and subsequent determinations based on weight of evidence. Route and duration of exposure, consideration of vulnerable populations (e.g. children), validation of key scientific studies, and their applicability to human health effects (including those resulting from changes in endocrine function) are
	weighed when making a risk determination. Health Canada routinely takes into account long-term exposures in its risk assessments, based on the availability of study data. Aggregate/cumulative exposures and transgenerational effects are also investigated, although these factors typically depend on the availability of very specific study data.

The full text of the petitions and responses can be found in the petitions catalogue on the Office's website (www.oag-bvg.gc.ca).

- environmental matter in the context of sustainable development." Section 21.1 of the Act explicitly links environmental and economic issues, describing sustainable development as "a continually evolving concept based on the integration of social, economic and environmental concerns." Further, the Federal Sustainable Development Act describes the basic principle of sustainable development as "an ecologically efficient use of natural, social and economic resources" and the integration of "environmental, economic and social factors in the making of all decisions by government."
- 6.41 Moreover, the revised Cabinet Directive on Strategic Environmental Assessments, released in 2010, states that the government is committed to the goal of sustainable development, and that decision makers at all levels must be able to take economic, social, and environmental considerations into account in order to make informed decisions in support of sustainable development.

^{*} Petition 300 was received in 2009-10, but the response was due in 2010-11.

Consequently, environmental issues in the context of sustainable development are not limited to biophysical concerns. In our view, the petitioner's question fell within the scope of an environmental petition under the Act, and responsible ministers were therefore required to consider the question and provide a reply that responds to the question.

- **6.42** In our view, departments have three options for responding to petitioners' questions:
 - They can provide the information requested, if available.
 - They can explain that the requested information is not available.
 - They can provide a rationale or explanation for why available information may not be provided.
- 6.43 We communicated our views to the departments concerned. In subsequent communications with the Office, the three departments explained that subsequent events related to the issue in this petition, including the receipt of a follow-up petition in June 2011, would preclude them from providing a substantive response to the petitioner. However, at the time of preparing this report, the departments had not yet conveyed their explanation to the petitioner with respect to the question in the original petition.
- 6.44 Petition 308, federal roles and responsibilities for environmental protection. The petitioner asked the federal government to explain its environmental protection mandate regarding shale gas extraction in Quebec. In particular, the first question of this petition asked:

What are the federal government's areas of jurisdiction, and which federal statutes take precedence over provincial environmental protection laws that would allow the Canadian government to intervene in shale gas exploration and development in Quebec? In the event of shared jurisdiction, how would it be shared between the federal and provincial governments?

6.45 The ministers responsible for Agriculture and Agri-Food Canada, Fisheries and Oceans Canada, Natural Resources Canada, and Health Canada replied that because of the nature of the question, the Minister of Justice would answer. While the Minister of the Environment responded to part of another question, he did not specifically reply to this question. On behalf of all the petitioned departments, the Minister of Justice responded, "This question

constitutes a request for legal advice. The Minister of Justice cannot provide legal advice to citizens."

- 6.46 In our view, the petitioner simply wished to know the federal government's role in protecting the environment and human health in relation to shale gas exploration and extraction activities. The petitioner also wished to know how the federal and provincial government manage areas of shared jurisdiction.
- 6.47 The petitioned departments are responsible for the implementation of laws, regulations, and programs that could be relevant to the shale gas issue, including the Canadian Environmental Assessment Act, the Fisheries Act, and the Canadian Environmental Protection Act, 1999 (CEPA 1999). In our view, a substantive response to the petitioner's question was warranted—one that would provide a description of federal jurisdiction for environmental protection in areas potentially affected by shale gas exploration. Such a response would not, in our view, constitute legal interpretation or advice.
- 6.48 At the same time as this petition, we received another petition on the same topic: Petition 307, the federal government's role in regulating shale gas exploration in Quebec. The same departments responded with detailed descriptions of federal responsibilities related to environmental protection in the context of shale gas exploration. For example, Fisheries and Oceans Canada described its responsibilities under the Fisheries Act, specifically those related to the harmful alteration, disruption, or destruction of fish habitat. Health Canada explained that the Canadian Environmental Protection Act, 1999 is one of the federal acts that it can use to help protect the health of Canadians, and that the Act sets out the Department's responsibilities for the assessment of chemical substances. Environment Canada also described its responsibilities under CEPA 1999 as well as its pollution prevention responsibilities under the Fisheries Act.
- 6.49 We communicated our views to the departments concerned; their officials stated that the departments stood by their responses. While their responses to Petition 308 comply with the requirements of the Act, we believe that the petitioned departments have not provided a substantive response to what, in our view, represents an appropriate question in the petitions process. We believe that this approach to responding to petition questions does not acknowledge the objective of the petitions process: namely, to provide Canadians with an avenue to receive information pertaining to questions about environmental matters in the context of sustainable development.

Recent audit work has made use of petitions and responses

6.50 The Office's audit work is shaped by specific petition topics, the broader environmental issues, and common themes. Recent audit work in our Office has benefited from knowledge gained through petitions and responses. For example, in the October 2011 Report of the Commissioner of the Environment and Sustainable Development, Chapter 2, Assessing Cumulative Environmental Effects of Oil Sands Projects, we took into account the government's response to Petition 263, which asked for the status of joint panel recommendations to the federal government. Those recommendations included items such as the inclusion of conditions of approval requiring project proponents to provide additional monitoring and reports.

Conclusion

- **6.51** The environmental petitions process remains a unique way for Canadians to present their concerns to federal ministers. Through the process, they can also request information and, in some cases, ask for commitments to action.
- **6.52** The Office of the Auditor General of Canada received 25 petitions this year, compared with 18 last year and 28 the year before. There continues to be a diversity of topics and issues in the petitions received.
- **6.53** Of the responses this year, 92 percent were on time. This is comparable to last year's 93 percent and significantly higher than the figure for the preceding year (77 percent). The two departments that responded to the most petitions, Environment Canada and Health Canada, both responded on time in 100 percent of the cases.
- 6.54 We found that most responses were complete and relevant. Nevertheless, we noted some cases in which the responsible federal ministers did not provide substantive answers to petitioners' questions. High-quality responses are key to achieving the objective of the environmental petitions process, which is to allow Canadians to receive information pertaining to questions about an environmental matter in the context of sustainable development. Petitioners have a role to play by submitting petitions that are clear, concise, and well researched. For their part, departments and agencies have a responsibility to provide complete and relevant responses.

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6.55 We will continue to work to promote high-quality petition responses. We will also continue to consider information from petitions and responses when we plan for audits and studies. These actions, among others, are designed to help petitions play their part in influencing the federal government's management of environmental issues.

About the Annual Report

Objective

The objective of this annual report is to inform Parliament and Canadians about the use of the environmental petitions process. In accordance with section 23 of the Auditor General Act, the report describes the number, nature, and status of petitions received, and the timeliness of responses from ministers.

Scope and approach

The annual report on environmental petitions summarizes the monitoring of the petitions process by the Commissioner of the Environment and Sustainable Development within the Office of the Auditor General of Canada.

Period covered by the annual report

This annual report on environmental petitions covers the period from 1 July 2010 to 30 June 2011. The Appendix includes summaries of the petitions received during the reporting period. The work for this report was substantially completed on 15 July 2011.

Petitions team

Principal: Andrew Ferguson Director: David Willey

Hélène Charest Lyane Maisonneuve Boris Romaguer Johanne Sanschagrin Mary-Lynne Weightman

For information, please contact Communications at 613-995-3708 or 1-888-761-5953 (toll-free).

Appendix Petitions activity (1 July 2010 to 30 June 2011)

This appendix includes a summary of the petitions (follow-up and new issues) received during the activity period noted above. To access the full text of petitions and responses from the creation of the environmental petitions process in 1995 to 30 June 2011, go to the petitions catalogue on our website. If necessary, paper copies of the catalogue can be obtained on request.

Petition 122E: Follow-up petition on a housing development near Mission, British Columbia

Date received: 25 August 2010 Petitioner: A Canadian resident

Summary: The petitioner is concerned about the potential impact of a housing development project on the Silvermere Lake and lower Stave River ecosystems near Mission, British Columbia. The petitioner is concerned that an environmental assessment of this project, pursuant to the Canadian Environmental Assessment Act, was terminated before it was completed. The petitioner asks Fisheries and Oceans Canada to explain both its reasons for terminating the assessment and its plans for enforcing the Fisheries Act. In addition, the petitioner asks Environment Canada about what it is doing to protect species at risk in these ecosystems.

Issues: Biological diversity, compliance and enforcement, environmental assessment, and fisheries Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada

Status: Completed

Petition No. 240D: Follow-up petition on environmental concerns regarding the Cacouna marsh

Date received: 3 March 2011 Petitioner: Gérard Michaud

Summary: In this follow-up petition, the petitioner raises additional concerns related to activities in the Port of Gros-Cacouna, Quebec, particularly with respect to sediment from dredging operations. In addition to questions about environmental assessment of the potential long-term impact of these activities, the petitioner asks about the potential health impact of heavy metals in sediments on plants used as a food source.

Issues: Environmental assessment, fisheries, human and environmental health, and toxic substances

Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Health Canada, Transport Canada

Status: Replies received but not yet posted

Petition No. 299B: Follow-up petition on the regulation and approval of fluoridation products added to drinking water

Date received: 23 November 2010

Petitioners: Gilles Parent and Pierre Jean Morin

Summary: In this follow-up petition, the petitioners seek further information about fluoridation products being added to drinking water. Referring to Health Canada's assertion, in its response to their first petition, that fluoridation products are mineral nutrients, the petitioners ask the Department to explain how it ensures that these products conform with federal food and drug standards.

Issues: Compliance and enforcement, human and environmental health, toxic substances, and water

Federal department responsible for reply: Health Canada

Status: Completed

Petition No. 299C: Follow-up petition on the regulation and approval of fluoridation products added to drinking water

Date received: 20 December 2010

Petitioners: Gilles Parent and Pierre Jean Morin

Summary: In this follow-up petition, the petitioners refer to a Supreme Court decision that they claim describes fluoridation products as medication, and they ask Health Canada to reconcile this with its claim that fluoridation products are mineral nutrients. The petitioners ask the Department of Justice Canada whether the fluoridation of drinking water respects the Canadian Charter of Rights and Freedoms. They also ask Environment Canada and Health Canada to describe the studies done and actions taken to assess the impact of fluoridation on aquatic ecosystems.

Issues: Compliance and enforcement, human and environmental health, toxic substances, and water Federal departments responsible for reply: Environment Canada, Health Canada, Justice Canada Status: Completed

Potition 301B: Follow-up petition on the alleged misinterpretation of exclusion list conditions under the Canadian Environmental Assessment Act, related to the construction of a communications tower in

Pontiac. Quebec

Date received: 31 December 2010

Petitioner: James Riordan

Summary: Following up on departmental responses to his previous petition, the petitioner asks Industry Canada to explain the criteria it used to exclude both the withdrawn project and its replacement from environmental assessment. He asks Environment Canada for information about the tracking of similar types of projects that have also been excluded from environmental assessment. He also asks Health Canada for its views on a recent study of the health effects of radiation exposure from telecommunications towers.

Issues: Environmental assessment, and human and environmental health

Federal departments responsible for reply: Environment Canada, Health Canada, Industry Canada

Status: Completed

Patition No. 301C: Follow-up petition on the alleged misinterpretation of exclusion list conditions under the Canadian Environmental Assessment Act, related to the construction of a communications tower in Pontiac, Quebec

Date received: 30 June 2011

Petitioner: James Riordan

Summary: Following up on departmental responses to his previous petitions, the petitioner asks Industry Canada and Environment Canada to explain the rationale behind their interpretation of "footprint" under the Canadian Environmental Assessment Act's Exclusion List Regulations. The petitioner is concerned that Industry

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Canada excludes antenna projects from environmental assessment by calculating the project's footprint by individual element rather than as the sum of the constituent elements or as the total land area needed for the structure. The petitioner also asks Environment Canada to reconsider its position on tracking projects excluded from an environmental assessment.

Issues: Environmental assessment, and science and technology

Federal departments responsible for reply: Environment Canada, Industry Canada

Status: Replies received but not yet posted

Petition No. 302: Potential environmental impact of hydro projects on First Nations lands and waterways in Manitoba

Date received: 30 August 2010

Petitioner: Southern Chiefs' Organization Inc.

Summary: The petitioner is concerned about the potential environmental impact of hydro projects on First Nations lands and waterways in Manitoba. The petitioner claims that these projects were approved without adequate consultation with First Nations and were not in compliance with federal processes for environmental assessments. The petitioner asks the federal government about assessments that have been carried out and requests that federal departments investigate the environmental impact of these hydro projects.

Issues: Aboriginal affairs, compliance and enforcement, environmental assessment, and fisheries

Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Health Canada, Aboriginal Affairs and Northern Development Canada, Natural Resources Canada, Transport Canada

Status: Replies received but not yet posted

Petition No. 302B : Follow-up petition on the potential environmental impact of hydro projects on First Nations lands and waterways in Manitoba

Date received: 8 June 2011

Petitioner: Southern Chiefs' Organization Inc.

Summary: In this follow-up petition, the petitioner asks federal departments to provide specific details about their consultations with First Nations on the potential impact of Manitoba hydro projects on First Nations lands and waterways. The petitioner also asks the departments to provide a commitment to, and an action plan for, carrying out future consultations with First Nations.

Issues: Aboriginal affairs and environmental assessment

Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Health Canada, Aboriginal Affairs and Northern Development Canada, Natural Resources Canada, Transport Canada

Petition No. 303: Alleged discharge of sewage sludge into the St. Lawrence River near the municipality of L'Isle-Verte, Quebec

Date received: 14 September 2010

Petitioner: Gaston Hervieux

Summary: The petitioner is concerned about the potential environmental impact of the alleged discharge of sewage sludge into the St. Lawrence River, from the sewage aeration lagoons of the municipality of l'Isle-Verte, Quebec. The petitioner asks the federal government about its role and responsibilities in this area, and asks what measures it will take to ensure that its provincial and municipal counterparts respect federal environmental regulations.

Issues: Compliance and enforcement, federal-provincial relations, waste management, and water

Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Justice Canada

Status: Completed

Petition No. 303B: Follow-up petition on an alleged discharge of sewage sludge into the St. Lawrence River near the municipality of L'Isle-Verte, Quebec

Date received: 23 March 2011 Petitioner: Gaston Hervieux

Summary: In this follow-up petition, the petitioner seeks further explanation from Environment Canada on a number of its responses to the original petition. In particular, the petitioner asks Environment Canada to describe the investigation and enforcement action it has taken in response to the alleged discharge of sewage sludge into the St. Lawrence River.

Issues: Compliance and enforcement, waste management, and water

Federal department responsible for reply: Environment Canada

Status: Reply received but not yet posted

Petition No. 304: Federal regulation of Canadian mining companies operating in Canada and abroad

Date received: 16 September 2010

Petitioner: Isabelle Sawyer

Summary: The petitioner is concerned that federal mining laws and regulations may not apply to Canadian mining companies operating abroad. The petitioner asks the federal government to explain what laws and regulations govern mining in Canada and whether they also apply to Canadian mining operations outside the country. The petitioner also inquires about the potential legal and financial consequences for mining companies that infringe on federal mining laws and regulations.

Issues: Compliance and enforcement, and natural resources

Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Foreign Affairs and International Trade Canada, Aboriginal Affairs and Northern Development Canada, Natural Resources Canada, Transport Canada

Status: Completed

Petition 305: Accountability for labelling of genetically modified organisms

Date received: 16 September 2010

Petitioners: Canadian Institute for Environmental Law and Policy, and The Canadian Council of Churches

Summary: The petitioners are concerned that the federal government is not monitoring the use or evaluating the effectiveness of its voluntary labelling standard for genetically modified organisms. The petitioners ask the federal government about its plans to monitor and evaluate the effectiveness of the standard. They also ask whether the federal government has assessed and considered the labelling practices in other jurisdictions. In addition, the petitioners ask the government to describe circumstances under which it would implement mandatory labelling of genetically modified organisms, because they are concerned that such organisms may have an impact on the environment and on human health.

Issues: Agriculture, environmental assessment, and human and environmental health

Federal departments responsible for reply: Agriculture and Agri-Food Canada, Environment Canada, Health Canada, Public Works and Government Services Canada

Status: Completed

Petition No. 306: Regulation of biosolid-based fertilizers under the Fertilizers Act

Date received: 31 December 2010

Petitioner: John Mitchell

Summary: The petitioner alleges that the definition of "sell" in the *Fertilizers Act* was amended in 1957 to include the word "distribute." He also alleges that Agriculture and Agri-Food Canada does not accept this definition and does not regulate fertilizers that are distributed freely, such as sewage sludge or biosolids. The petitioner is concerned that biosolid-based fertilizers have been allowed into the food chain and that they may affect human and environmental health.

Issues: Agriculture, compliance and enforcement, human and environmental health, and toxic substances Federal departments responsible for reply: Agriculture and Agri-Food Canada, Health Canada, Industry Canada

Status: Completed

Petition 307: The federal government's role in regulating shale gas exploration in Quebec

Date received: 30 December 2010 Petitioner: Simon-Philippe Breton

Summary: The petitioner is concerned about the potential impact on environmental and human health of shale gas exploration in the St. Lawrence Valley in Quebec. The petitioner asks federal departments to describe what steps, policies, and actions the government could take to protect soil and water quality, riparian flora and fauna (found on the banks of rivers or other bodies of water), agriculture, and human health.

Issues: Environmental assessment, federal-provincial relations, human and environmental health, natural resources, and water

Federal departments responsible for reply: Agriculture and Agri-Food Canada, Environment Canada, Fisheries and Oceans Canada, Health Canada, Natural Resources Canada

Status: Completed

Potition No. 308: Federal government responsibilities for shale gas extraction in Quebec

Date received: 30 December 2010

Petitioner: Joël Bédard

Summary: The petitioner is concerned about the potential environmental and human health impacts of shale gas extraction in the St. Lawrence Valley in Quebec. The petitioner asks the federal government to explain its mandate in this area, including legislation and policies, and how the federal and provincial governments manage shared responsibilities. In addition, the petitioner raises concerns about Quebec laws related to shale gas extraction that the petitioner claims may violate the Canadian Charter of Rights and Freedoms.

Issues: Agriculture, federal-provincial relations, human and environmental health, natural resources, and toxic substances

Federal departments responsible for reply: Agriculture and Agri-Food Canada, Environment Canada, Fisheries and Oceans Canada, Health Canada, Justice Canada, Natural Resources Canada

Status: Completed

Petition No. 309: Construction of a hotel in a wetland area near the Ottawa International Airport

Date received: 7 January 2011

Petitioner: CREDDO (Conseil régional de l'environnement et du développement durable de l'Outaouais)

Summary: The petitioner is concerned about tree cutting that took place for the construction of a convention centre and a hotel in a wetland area belonging to Transport Canada and leased to the Ottawa International Airport. The petitioner asks whether the federal government should wait for the publication of a report by the Province of Ontario regarding the assessment of these wetlands before beginning construction. Furthermore, the petitioner asks the federal government whether this construction project contravenes environmental and sustainable development legislation, such as the *Species at Risk Act*.

Issues: Compliance and enforcement, environmental assessment, federal-provincial relations, and fisheries Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Transport Canada

Status: Replies received but not yet posted

Petition No. 310: Health and environmental impact of endocrine disrupting chemicals used in cosmetics

Date received: 26 January 2011

Petitioners: Suzuki Foundation and Réseau des femmes en environnement

Summary: The petitioners allege that endocrine disrupting chemicals are used in cosmetic products in Canada. They are concerned about the consequences this may have on the health of humans and on the environment. The petitioners ask Health Canada how it interprets and enforces the *Food and Drugs Act* and the *Cosmetics Regulations* with respect to these substances. They also ask Environment Canada how it monitors the release of endocrine disrupting chemicals into the environment.

Issues: Human and environmental health, and toxic substances

Federal departments responsible for reply: Environment Canada, Health Canada

Petition No. 311: Abandonment of the Migratory Birds Convention Act incidental take regulatory initiative

Date received: 3 February 2011 **Petitioner:** Ecojustice Canada

Summary: The petitioner is concerned that Environment Canada is abandoning a regulatory initiative that would have regulated the destruction of migratory birds or their nests and replacing it with a Best Management Practices regime. The petitioner asks Environment Canada to explain how it will enforce the *Migratory Birds Convention Act*, 1994 with respect to logging and other industrial activities, and to provide information about its proposed Best Management Practices regime. The petitioner believes that Canada continues to be in violation of a North American Agreement on Environmental Cooperation decision and asks Foreign Affairs and International Trade Canada to explain its position.

Issues: Biological diversity, compliance and enforcement, and international cooperation

Federal departments responsible for reply: Environment Canada, Foreign Affairs and International Trade Canada

Status: Replies received but not yet posted

Petition No. 312: Federal funding for road construction in a designated flood plain in Ottawa, Ontario

Date received: 8 February 2011

Petitioner: Ted Cooper

Summary: The petitioner alleges that the Terry Fox Drive extension in Ottawa, Ontario, is being constructed in a flood plain designated under the Canada–Ontario Flood Damage Reduction Program. He asks Environment Canada how issues related to construction of a road in a designated flood plain were considered in the environmental assessment of the project.

Issues: Environmental assessment and federal-provincial relations Federal department responsible for reply: Environment Canada

Status: Reply received but not yet posted

Petition No. 313: Concerns about the environmental assessment for the construction of a security fence at Canadian Forces Base Kingston in Ontario

Date received: 11 February 2011

Petitioners: Residents of Ravensview Subdivision, Kingston, Ontario

Summary: The petitioners are concerned that the environmental assessment for the construction of a security fence at Canadian Forces Base Kingston was carried out without adequate public consultation. They also allege that the assessment report contains factual errors in a number of areas, including wildlife, aquatic habitat, and cultural heritage. The petitioners ask National Defence and other relevant departments to explain their actions and to provide information in support of statements and commitments made in the environmental assessment.

Issue: Environmental assessment

Federal departments responsible for reply: Canadian Heritage, Environment Canada, Fisheries and Oceans Canada, National Defence

Petition No. 314: Concerns about the adequacy of environmental assessment for the construction of a sports dome on National Defence property in Kingston, Ontario

Date received: 2 June 2011

Petitioner: Save Kingston's Heritage Gateway

Summary: The petitioner is concerned about the potential impact of a sports dome that National Defence proposes to build on its property in Kingston, Ontario. The petitioner claims that the environmental assessment was not properly carried out and alleges that the assessment did not consider or propose mitigation measures for some significant adverse impacts. These include noise and light pollution, possible soil contamination, and the potential impact on the cultural and heritage character of the area. The petitioner is also concerned about the absence of consultation with the public and other federal authorities in the environmental assessment process for this project.

Issue: Environmental assessment

Federal departments responsible for reply: Canadian Heritage, Environment Canada, National Defence, Parks Canada

Status: Replies received but not yet posted

Petition No. 315: Environmental assessment of a project on federal wetlands located in the Greenbelt near the Ottawa International Airport

Date received: 8 June 2011 Petitioner: Lucia Alloggia

Summary: The petitioner raises concerns about the environmental assessment process for a development project on federal wetlands located in the Greenbelt near the Ottawa International Airport. The petitioner asks the federal government how it considered the potential environmental impact of the project on fish habitat, endangered species, and wetlands.

Issues: Biological diversity, compliance and enforcement, environmental assessment, and fisheries

Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Transport Canada

Status: Replies received but not yet posted

Petition No. 316; Environmental risks related to asphalt waste allegedly dumped in Wainfleet, Ontario

Date received: 7 June 2011

Petitioners: Alexander and Olivera Davidoff

Summary: The petitioners are concerned about the environmental impact of contaminants from asphalt allegedly dumped on private property in Wainfleet, Ontario, and potentially leaching into the surrounding aquatic ecosystems through groundwater and runoff. The petitioners claim that this could have an impact on fish and fish habitat, as well as local fisheries, and asks how federal departments have assessed the potential risks. The petitioners also ask how the federal government can expedite the cleanup of the site.

Issues: Compliance and enforcement, fisheries, toxic substances, waste management, and water

Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Health Canada

Petition No. 317: National Pollutant Release Inventory reporting of chemicals used for shale gas and in-situ mining

Date received: 22 June 2011

Petitioners: Environmental Defence, Association québécoise de lutte contre la pollution atmosphérique (AQLPA), and West Coast Environmental Law Association

Summary: The petitioners are concerned that the chemicals used in shale gas extraction and in-situ mining are not being reported to the National Pollutant Release Inventory (NPRI). The petitioners claim that some of the chemicals used in these extraction processes can affect human health and are listed as Group 1 substances for reporting to the NPRI. The petitioners are concerned that current NPRI reporting requirements exclude oil and gas exploration and drilling activities, and they ask Environment Canada how it tracks and reports on the substances used in these extraction processes.

Issues: Human and environmental health, toxic substances, and water

Federal department responsible for reply: Environment Canada

Status: Replies received but not yet posted

Petition No. 318: Use of toxic chemicals to control sea lice at salmon aquaculture sites in New Brunswick

Date received: 15 June 2011

Petitioner: Grand Manan Fishermen's Association Inc.

Summary: The petitioner is concerned about the use of various chemicals to control sea lice at salmon aquaculture farms in southwestern New Brunswick since 2009. The petitioner asks whether the chemicals used to treat sea lice infestations at the aquaculture sites are considered deleterious substances under the *Fisheries* Act and whether their release into the water could be considered a destruction of fish habitat. The petitioner also asks about the process for registering pesticides for emergency use and the proposed regulations regarding fish pathogens and pest treatments.

Issues: Compliance and enforcement, fisheries, pesticides, toxic substances, and water

Federal departments responsible for reply: Environment Canada, Fisheries and Oceans Canada, Health Canada



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